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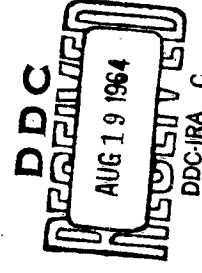
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# A CLIMATOLOGY OF WIND AND TEMPERATURES IN THE TROPICAL STRATOSPHERE BETWEEN 100 MB. AND 10 MB.



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MAY 1964

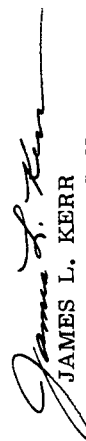
## FOREWORD

This publication was prepared under Task 26, "Upper Atmospheric Analysis and Forecasting", and is intended to introduce the navy meteorologist to the recent discovery of the 26-month oscillation of zonal winds and temperatures in the tropical stratosphere.

The climatological information contained in this report compares the annual and 26-month variation of winds and temperatures in the area from 100 mb. to 10 mb. over the equatorial regions of the earth, and is the most current and extensive climatology available on this subject.

Dr. Richard J. Reed, Professor in the Department of Atmospheric Sciences at the University of Washington, Seattle, Washington, and a Consultant for the Navy Weather Research Facility, planned and wrote this climatological report for NWRFF. Mr. John M. Mercer performed the final edit for the Navy Weather Research Facility with contributions from Mr. René V. Cormier.

This publication has been reviewed and approved on 7 May 1964 by the undersigned.



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## 1. INTRODUCTION

The recent discovery [1, 2] of a large, quasi-periodic oscillation of the zonal wind component in the equatorial stratosphere, with average period close to 26 months, has aroused new interest in the circulation of that portion of the atmosphere and has created a need for climatological information which recognizes the existence of both the annual and longer-period variations of wind and temperature. In the present work, data from selected tropical stations for the period 1951 through 1961 are used to characterize the annual and 26-month variations in the zone between 25° N. and 25° S. and in the layer between 100 mb. (16.6 km.) and 10 mb. (31.0 km.). Information is also presented on the long-term (10 year) mean zonal wind and temperature fields and on the short-period (intramonthly) variability of the zonal and meridional wind components.

The characterization of the long-period variation poses a new and unique problem in climatology. The procedure adopted here has been to separate the annual and 26-month component oscillations and to present separate statistics on each. The choice of a 26-month time scale for the longer-period cycle was dictated by the results of autocorrelation analyses of zonal wind components (with annual cycle removed) for a large number of tropical stations. These analyses yielded an average fig-

ure of 25.8 months for the main peak in the autocorrelation function. It is important to note, however, that the cycle is by no means a perfect sinusoid of fixed period and amplitude. An idea of the irregularity of the oscillation may be gained from figure 1.1 which gives a time-height cross section of zonal winds at Canton Island for the period 1953 through 1963. From the diagram it is apparent that the length of cycle varies between 22 and 28 months.

The mode of presentation adopted here makes it possible by simple addition of the two component variations to reconstruct, approximately, the total variations of wind and temperature during the period 1951 through 1961 and to project the variations somewhat into the future. For the purpose of superimposing the cycles, as well as for other reasons, it is necessary to construct a 26-month calendar and establish its relationship to the 12-month calendar. The designations 0, 1, 2, . . . 25 will be used to denote the months on the 26-month time scale with the month "0" corresponding to January 1951, March 1953, May 1955, July 1957, September 1959 and November 1961. The following table (1.1) will be helpful in determining the phase of the 26-month cycle which corresponds to a particular month on the ordinary calendar.

Table 1.1. Comparison of the 12-Month Calendar and the Corresponding Month of the 26-Month Cycle (January 1951 through December 1963).

|      | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|------|------|------|------|------|-----|------|------|------|-------|------|------|------|
| 1951 | 0    | 1    | 2    | 3    | 4   | 5    | 6    | 7    | 8     | 9    | 10   | 11   |
| 1952 | 12   | 13   | 14   | 15   | 16  | 17   | 18   | 19   | 20    | 21   | 22   | 23   |
| 1953 | 24   | 25   | 0    | 1    | 2   | 3    | 4    | 5    | 6     | 7    | 8    | 9    |
| 1954 | 10   | 11   | 12   | 13   | 14  | 15   | 16   | 17   | 18    | 19   | 20   | 21   |
| 1955 | 22   | 23   | 24   | 25   | 0   | 1    | 2    | 3    | 4     | 5    | 6    | 7    |
| 1956 | 8    | 9    | 10   | 11   | 12  | 13   | 14   | 15   | 16    | 17   | 18   | 19   |
| 1957 | 20   | 21   | 22   | 23   | 24  | 25   | 0    | 1    | 2     | 3    | 4    | 5    |
| 1958 | 6    | 7    | 8    | 9    | 10  | 11   | 12   | 13   | 14    | 15   | 16   | 17   |
| 1959 | 18   | 19   | 20   | 21   | 22  | 23   | 24   | 25   | 0     | 1    | 2    | 3    |
| 1960 | 4    | 5    | 6    | 7    | 8   | 9    | 10   | 11   | 12    | 13   | 14   | 15   |
| 1961 | 16   | 17   | 18   | 19   | 20  | 21   | 22   | 23   | 24    | 25   | 0    | 1    |
| 1962 | 2    | 3    | 4    | 5    | 6   | 7    | 8    | 9    | 10    | 11   | 12   | 13   |
| 1963 | 14   | 15   | 16   | 17   | 18  | 19   | 20   | 21   | 22    | 23   | 24   | 25   |

## 2. DATA

With the exception of the data for Nandi, Fiji Islands, which were taken from a publication of the New Zealand Meteorological Service [3], all data used in this atlas were obtained from the National Weather Records Center, Asheville, North Carolina. Data were requested for the years 1951 through 1960 inclusive and, in certain cases, for the additional year 1961. Both 0000 GCT (Greenwich civil time) and 1200 GCT observations were included.

The stations employed and the period of record at various heights are given in appendices A and B for wind and temperature, respectively. Only those Northern Hemisphere stations were selected which had comparatively long records extending to the higher levels, though less complete data were available from many other stations. In view of the small longitudinal differences that exist above 50 mb., it was felt that more representative results could

be obtained from a limited number of high quality records than from a larger selection of shorter records. No attempt was made to correct the results for inhomogeneities due to differences in record lengths between stations or between elevations at the same station.

The results for the Southern Hemisphere are necessarily based on considerably shorter records. Although some differences in the circulations of the two hemispheres must undoubtedly exist, little significance can be attached to asymmetrical features appearing on the various charts, since these may be almost entirely a consequence of differences in length of record. Mathematical analysis of the mean temperature data from the Southern Hemisphere was not undertaken. The long-term mean temperatures depicted on chart 4.13 south of the Equator were obtained indirectly from the wind field by use of the thermal wind relationship.

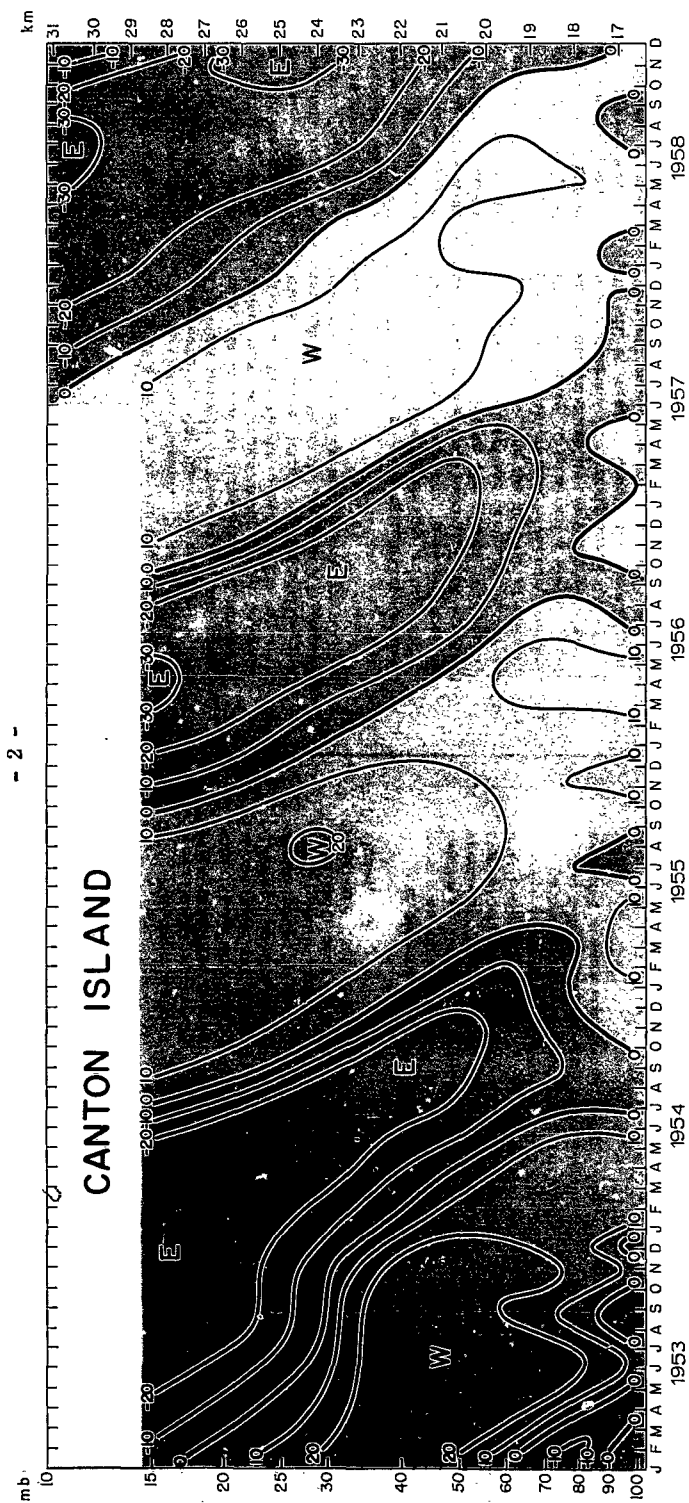


Figure 1.1. Time-Height Cross Section of Zonal Winds at Canton Island, 1953 through 1963.

### 3. PROCEDURES

The steps in the data analysis were as follows:

- (1) The averages for the various calendar months were obtained by averaging odd and even years separately and determining the combined averages. The separate treatment of odd and even years was necessitated by the presence of the approximately biennial cycle which can produce a distorted estimate if the average is taken in the ordinary way when the period of record is short and encompasses an odd number of years.

- (2) The long-term (approximately 10 year) averages were found by averaging the monthly means obtained in step (1).

- (3) Deviations of the monthly means from the record-means of the calendar months were obtained by subtracting the averages computed in step (1) from the means for in-

dividual months. For instance the deviation for July 1957 was found by subtracting the mean for that month from the long-term mean for July.

- (4) The deviations of step (3) were arranged in sequences of 28, and these sequences were averaged to obtain the shape of the 28-month cycle.
- (5) Harmonic analyses<sup>1</sup> were made of the annual and 28-month cycles in order to obtain an objective characterization of their phases and amplitudes.

<sup>1</sup>Given an arbitrary sequence of data points which are periodic, it is possible to determine a finite number of sine (or cosine) curves which when summed will pass through every point; that is, fit the data exactly. The method of finding the required set of sine waves is called *harmonic analysis*. The analysis technique yields the amplitude (departure of the maximum from the mean value) and phase (time of occurrence of the maximum of each component wave. The period of the first harmonic is equal to the fundamental or chosen period. The second harmonic has a period equal to half the fundamental, the third to one-third, and so on. The first two harmonics are shown, since in most instances they approximate the data with sufficient accuracy.

### 4. PREPARATION OF CHARTS AND TABLES

#### 4.1 Chart 4.1 and Table 4.1

The long-term mean zonal wind speeds determined in step (2) of chapter 3 were plotted on the meridional cross section and isopleths drawn subjectively at intervals of 2.5 meters per second. At 100 mb, the values in the Northern Hemisphere exhibited a strong dependence on longitude. For the purpose of obtaining more representative results at this level, zonal wind speeds were extracted at intervals of 5 degrees of latitude from meridional cross sections appearing in *U. S. Weather Bureau Technical Paper No. 41*, "Meridional Cross-Sections, Upper Winds Over the Northern Hemisphere," and average values for the latitude circles were determined. The analysis near 100 mb. is based largely on these supplementary data.

The tabulated values of mean zonal wind were obtained by interpolation from the analyzed chart.

#### 4.2 Chart 4.2 and Tables 4.2 and 4.3

The phases and amplitudes of the annual cycle of the zonal wind component determined in step (5) of chapter 3 were plotted on the meridional cross section and subjectively analyzed. Near the Equator the phase was too erratic to be analyzed reliably. The dates next to the isopleths of phase represent the times at which the annual cycle reaches its maximum westerly (west to east) value.

Tabulated values of amplitude and phase were obtained from the analyses by interpolation.

#### 4.3 Chart 4.3 and Tables 4.4 and 4.5

The phases and amplitudes of the 28-month cycle of the zonal wind component determined in step (5) of chapter 3 for the individual stations were plotted on the meridional cross section and subjectively analyzed. The phase indicates the date at which the 28-month cycle reaches its maximum westerly (west to east) value.

Tabulated values of amplitude and phase were obtained from the analyses by interpolation.

#### 4.4 Charts 4.4 through 4.7

The mean zonal winds for January, April, July, and October determined in step (1) of chapter 3 were plotted on the meridional cross sections and subjectively analyzed. For the purpose of achieving smoother and more representative analyses near 100 mb., use was made of supplementary data extracted from the cross sections in *U. S. Weather Bureau Technical Paper No. 41*.

#### 4.5 Chart 4.8

Cross sections of mean zonal wind, based on the results of step (1) of chapter 3, were analyzed for each month. Values were extracted from the monthly charts by interpolation for various levels at intervals of 5 degrees of latitude. The monthly values for particular levels and latitudes were then plotted and smooth curves drawn by eye.

#### 4.6 Chart 4.9

The deviations obtained in step (3) of chapter 3 were arranged in sequences of 28 months and averaged. The averages for every second month of the 28-month calendar were plotted on meridional cross sections and isopleths were drawn. Values for the various levels were extracted from the bimonthly charts at intervals of 5 degrees of latitude by interpolation. The values for particular levels and latitudes were then plotted on the 28-month time scale and smooth curves drawn by eye.

#### 4.7 Charts 4.10 and 4.11, and Tables 4.6 and 4.7

Standard deviations of the zonal and meridional wind components about their monthly means were computed for all months from the station data. The averages of these deviations at the various levels for the period of record were plotted on cross sections and analyzed subjectively.

Tabulated values of the standard deviations were obtained from the analyses by interpolation.

#### 4.8 Chart 4.12 and Table 4.8

Mean temperatures determined from the night soundings were plotted on the meridional



cross section. Analyses were based partly on these data and partly on temperatures computed from the zonal wind data by use of the thermal wind relationship. The latter temperatures were computed for every 5 degrees of latitude using the observed temperatures at 10° N. (mean of Balboa and Eniwetok temperatures) as a base.

Tabulated temperatures were obtained from the analysis by interpolation.

#### 4.9 Chart 4.13 and Tables 4.9 and 4.10

The phases and amplitudes of the annual temperature cycle determined in step (5) of chapter 3 were plotted on the meridional cross section and subjectively analyzed. Phases indicate times of maximum temperature. The thermal wind relationship was used to ensure that the temperature analysis was consistent

with the wind analysis of chart 4.2.

The tabulations of amplitudes and phases were obtained by interpolation from the analyzed chart.

#### 4.10 Chart 4.14 and Tables 4.11 and 4.12

The phases and amplitudes of the 28-month temperature cycle determined in step (5) of chapter 3 were plotted on the meridional cross section and subjectively analyzed. Phases indicate times of maximum temperature. The thermal wind relationship was used to ensure that the temperature analysis was consistent with the zonal wind analysis of chart 4.3.

The tabulations of amplitudes and phases were obtained by interpolation from the analyzed chart.

Table 4.1. Mean Zonal Wind (m./sec.).

| Pressure<br>(mb.) | 25° N. | 20° N. | 15° N. | 10° N. | 5° N. | 0°   | 5° S. | 10° S. | 15° S. | 20° S. | 25° S. | Height<br>(km.) |
|-------------------|--------|--------|--------|--------|-------|------|-------|--------|--------|--------|--------|-----------------|
| 100               | 8.0    | 3.0    | -0.5   | -2.5   | -1.0  | 3.0  | 1.5   | 2.0    | 4.5    | 8.0    | 12.0   | 16.6            |
| 80                | 4.0    | -2.0   | -5.0   | -6.0   | -3.5  | 2.5  | 0     | -2.5   | -0.5   | 2.5    | 6.0    | 17.9            |
| 60                | -1.5   | -6.0   | -8.0   | -6.0   | -2.5  | 1.0  | -2.0  | -6.0   | -6.0   | -3.0   | 0      | 19.6            |
| 50                | -4.0   | -8.0   | -9.0   | -8.0   | -3.5  | 0    | -3.5  | -7.5   | -8.5   | -6.0   | -2.5   | 20.7            |
| 40                | -6.5   | -9.0   | -10.0  | -9.0   | -5.0  | -2.5 | -5.5  | -10.0  | -10.5  | -8.0   | -4.0   | 22.0            |
| 30                | -7.5   | -10.0  | -11.5  | -10.5  | -6.5  | -4.0 | -7.0  | -11.0  | -12.0  | -9.0   | -6.0   | 23.8            |
| 20                | -8.0   | -11.0  | -12.5  | -11.5  | -8.0  | -6.5 | -8.0  | -12.0  | -12.5  | -9.0   | -6.0   | 26.4            |
| 15                | -8.0   | -11.0  | -13.0  | -11.5  | -9.0  | -7.5 | -9.0  | -12.0  | -12.5  | -9.0   | -6.0   | 28.3            |
| 10                | -7.5   | -11.0  | -13.0  | -12.5  | -10.5 | -9.0 | -10.0 | -12.5  | -12.5  | -9.0   | -5.5   | 31.0            |

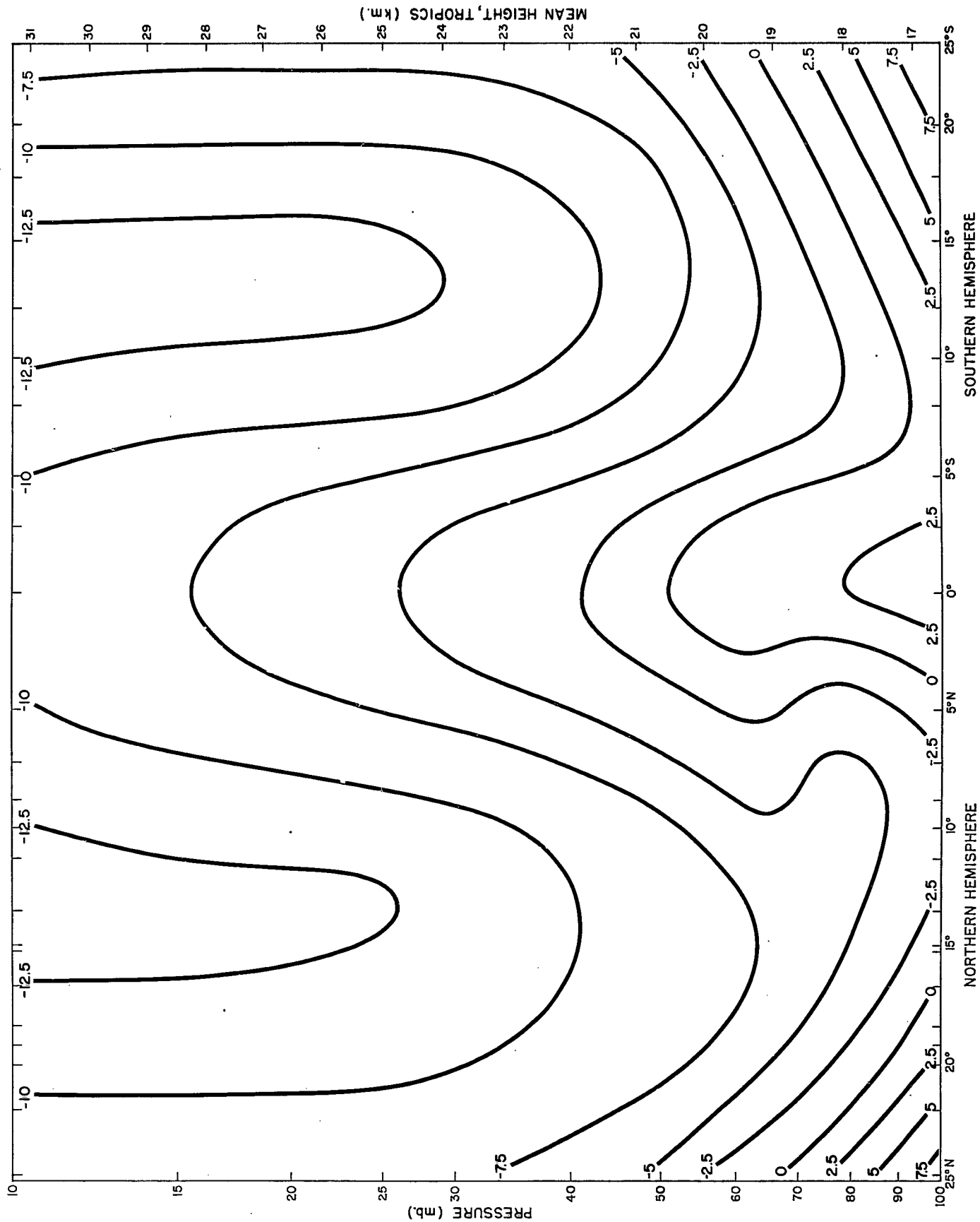


Table 4.2. Amplitude of the Annual Cycle of the Zonal Wind Component (m./sec.).

| Pressure<br>(mb.) | 25° N. | 20° N. | 15° N. | 10° N. | 5° N. | 0° | 5° S. | 10° S. | 15° S. | 20° S. | 25° S. | Height<br>(km.) |
|-------------------|--------|--------|--------|--------|-------|----|-------|--------|--------|--------|--------|-----------------|
| 100               | 11.0   | 10.0   | 8.5    | 6.0    | 4.0   | -  | 2.5   | 3.0    | 4.5    | 5.5    | 7.0    | 16.6            |
| 80                | 10.5   | 9.5    | 8.0    | 5.5    | 2.5   | -  | 1.5   | 3.0    | 4.5    | 6.0    | 7.5    | 17.9            |
| 60                | 10.5   | 9.0    | 7.5    | 5.5    | 3.0   | -  | 2.5   | 4.0    | 5.5    | 6.5    | 8.0    | 19.6            |
| 50                | 10.0   | 9.0    | 7.5    | 6.0    | 3.0   | -  | 3.0   | 5.0    | 6.5    | 7.5    | 9.0    | 20.7            |
| 40                | 10.5   | 9.0    | 8.0    | 6.5    | 3.0   | -  | 3.0   | 6.0    | 7.5    | 9.0    | 10.0   | 22.0            |
| 30                | 11.0   | 10.0   | 9.0    | 7.5    | 3.0   | -  | 2.5   | 7.0    | 10.0   | 11.0   | 12.0   | 23.8            |
| 20                | 12.0   | 11.0   | 10.5   | 8.5    | 3.0   | -  | 2.5   | 8.5    | 12.0   | 13.5   | 14.5   | 26.4            |
| 15                | 12.5   | 12.5   | 12.0   | 9.5    | 3.0   | -  | 2.5   | 8.5    | 13.0   | 15.0   | 16.0   | 28.3            |
| 10                | 17.0   | 16.5   | 14.0   | 10.0   | 3.0   | -  | 2.5   | 8.5    | 13.5   | 17.0   | 18.0   | 31.0            |

Table 4.3. Phase of the Annual Cycle of the Zonal Wind Component.

| Pressure<br>(mb.) | 25° N.  | 20° N.  | 15° N.  | 10° N.  | 5° N.   | 0° | 5° S.   | 10° S.  | 15° S. | 20° S. | 25° S. | Height<br>(km.) |
|-------------------|---------|---------|---------|---------|---------|----|---------|---------|--------|--------|--------|-----------------|
| 100               | Feb. 15 | Feb. 15 | Mar. 1  | Mar. 15 | Apr. 1  | -  | Aug. 1  | Aug. 1  | Aug. 1 | Aug. 1 | Aug. 1 | 16.6            |
| 80                | Feb. 15 | Feb. 15 | Feb. 15 | Mar. 1  | Mar. 1  | -  | Aug. 1  | Aug. 1  | Aug. 1 | Aug. 1 | Aug. 1 | 17.9            |
| 60                | Feb. 15 | Feb. 15 | Feb. 15 | Feb. 15 | Feb. 1  | -  | Aug. 1  | Aug. 15 | Aug. 1 | Aug. 1 | Aug. 1 | 19.6            |
| 50                | Feb. 15 | Feb. 1  | Feb. 15 | Feb. 15 | Jan. 15 | -  | Aug. 15 | Aug. 15 | Aug. 1 | Aug. 1 | Aug. 1 | 20.7            |
| 40                | Feb. 1  | Feb. 1  | Feb. 1  | Feb. 1  | Jan. 15 | -  | Aug. 1  | Aug. 15 | Aug. 1 | Aug. 1 | Aug. 1 | 22.0            |
| 30                | Feb. 1  | Feb. 1  | Feb. 1  | Feb. 1  | Jan. 15 | -  | Aug. 1  | Aug. 15 | Aug. 1 | Aug. 1 | Aug. 1 | 23.8            |
| 20                | Feb. 1  | Feb. 1  | Feb. 1  | Feb. 1  | Jan. 15 | -  | Aug. 1  | Aug. 1  | Aug. 1 | Aug. 1 | Aug. 1 | 26.4            |
| 15                | Feb. 1  | Feb. 1  | Feb. 1  | Jan. 15 | Jan. 15 | -  | Aug. 1  | Aug. 1  | Aug. 1 | Aug. 1 | Aug. 1 | 28.3            |
| 10                | Feb. 1  | Feb. 1  | Jan. 15 | Jan. 15 | Jan. 15 | -  | July 15 | July 15 | Aug. 1 | Aug. 1 | Aug. 1 | 31.0            |

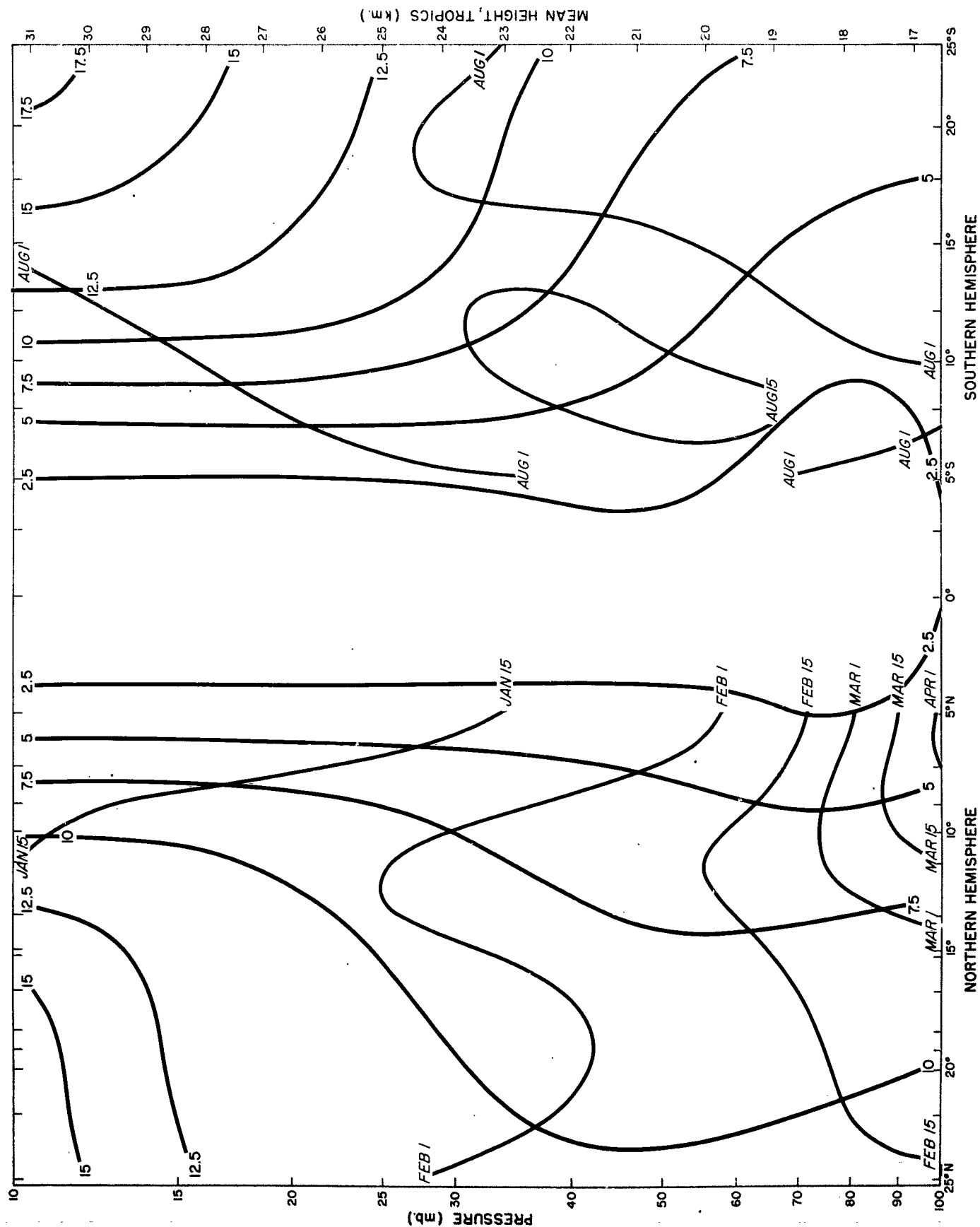


CHART 4.2. PHASE AND AMPLITUDE OF THE ANNUAL CYCLE OF ZONAL WIND (m./sec.).

Table 4.4. Amplitude of the 26-Month Cycle of the Zonal Wind Component (m./sec.).

| Pressure<br>(mb.) | 25° N. | 20° N. | 15° N. | 10° N. | 5° N. | 0°   | 5° S. | 10° S. | 15° S. | 20° S. | 25° S. | Height<br>(km.) |
|-------------------|--------|--------|--------|--------|-------|------|-------|--------|--------|--------|--------|-----------------|
| 100               | 2.0    | 1.5    | 1.0    | 1.5    | 2.0   | 2.0  | 2.0   | 1.5    | 1.0    | 1.0    | 1.0    | 16.6            |
| 80                | 2.0    | 1.5    | 2.0    | 3.5    | 5.0   | 6.0  | 4.0   | 2.5    | 2.0    | 1.0    | 0.5    | 17.9            |
| 60                | 2.0    | 2.0    | 4.0    | 7.0    | 10.0  | 12.0 | 10.0  | 5.0    | 3.0    | 1.5    | 0.5    | 19.6            |
| 50                | 1.5    | 2.0    | 5.0    | 9.0    | 13.5  | 16.0 | 13.5  | 7.5    | 4.0    | 2.5    | 1.0    | 20.7            |
| 40                | 1.0    | 2.5    | 6.0    | 11.0   | 16.5  | 19.0 | 17.0  | 11.5   | 5.0    | 3.0    | 2.0    | 22.0            |
| 30                | 0.5    | 3.0    | 6.5    | 11.5   | 17.0  | 21.0 | 18.5  | 14.5   | 8.0    | 4.0    | 2.5    | 23.8            |
| 20                | 1.0    | 3.5    | 7.5    | 11.5   | 15.5  | 18.5 | 16.5  | 13.5   | 9.0    | 4.5    | 3.5    | 26.4            |
| 15                | 2.0    | 4.5    | 9.0    | 12.0   | 15.5  | 18.0 | 16.0  | 12.0   | 8.5    | 5.0    | 4.0    | 28.3            |
| 10                | 3.0    | 7.5    | 11.0   | 14.0   | 17.0  | 18.5 | 17.0  | 12.5   | 8.5    | 6.0    | 4.5    | 31.0            |

Table 4.5. Phase of the 26-Month Cycle of the Zonal Wind Component.

| Pressure<br>(mb.) | 25° N.   | 20° N.   | 15° N.  | 10° N.  | 5° N.   | 0°      | 5° S.   | 10° S.  | 15° S.  | 20° S.  | 25° S.  | Height<br>(km.) |
|-------------------|----------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----------------|
| 100               | Feb. 58  | Feb. 58  | Mar. 58 | Mar. 58 | Mar. 58 | Mar. 58 | Mar. 58 | Mar. 58 | Mar. 58 | Mar. 58 | Mar. 58 | 16.6            |
| 80                | Jan. 58  | Dec. 57  | Jan. 58 | Feb. 58 | Feb. 58 | Feb. 58 | Feb. 58 | Feb. 58 | Feb. 58 | Feb. 58 | Feb. 58 | 17.9            |
| 60                | Nov. 57  | Oct. 57  | Dec. 57 | Dec. 57 | Dec. 57 | Dec. 57 | Dec. 57 | Dec. 57 | Dec. 57 | Dec. 57 | Dec. 57 | 19.6            |
| 50                | Oct. 57  | Sept. 57 | Nov. 57 | Nov. 57 | Nov. 57 | Nov. 57 | Nov. 57 | Nov. 57 | Nov. 57 | Nov. 57 | Nov. 57 | 20.7            |
| 40                | Sept. 57 | Aug. 57  | Oct. 57 | Oct. 57 | Oct. 57 | Oct. 57 | Oct. 57 | Oct. 57 | Oct. 57 | Oct. 57 | Oct. 57 | 22.0            |
| 30                | July 57  | June 57  | Aug. 57 | Aug. 57 | July 57 | July 57 | July 57 | July 57 | July 57 | July 57 | July 57 | 23.8            |
| 20                | May 57   | Apr. 57  | May 57  | May 57  | May 57  | May 57  | May 57  | May 57  | May 57  | May 57  | May 57  | 26.4            |
| 15                | Mar. 57  | Mar. 57  | Apr. 57 | Apr. 57 | Apr. 57 | Apr. 57 | Apr. 57 | Apr. 57 | Mar. 57 | Mar. 57 | Mar. 57 | 28.3            |
| 10                | Jan. 57  | Jan. 57  | Feb. 57 | Feb. 57 | Feb. 57 | Feb. 57 | Feb. 57 | Jan. 57 | Jan. 57 | Jan. 57 | Jan. 57 | 31.0            |

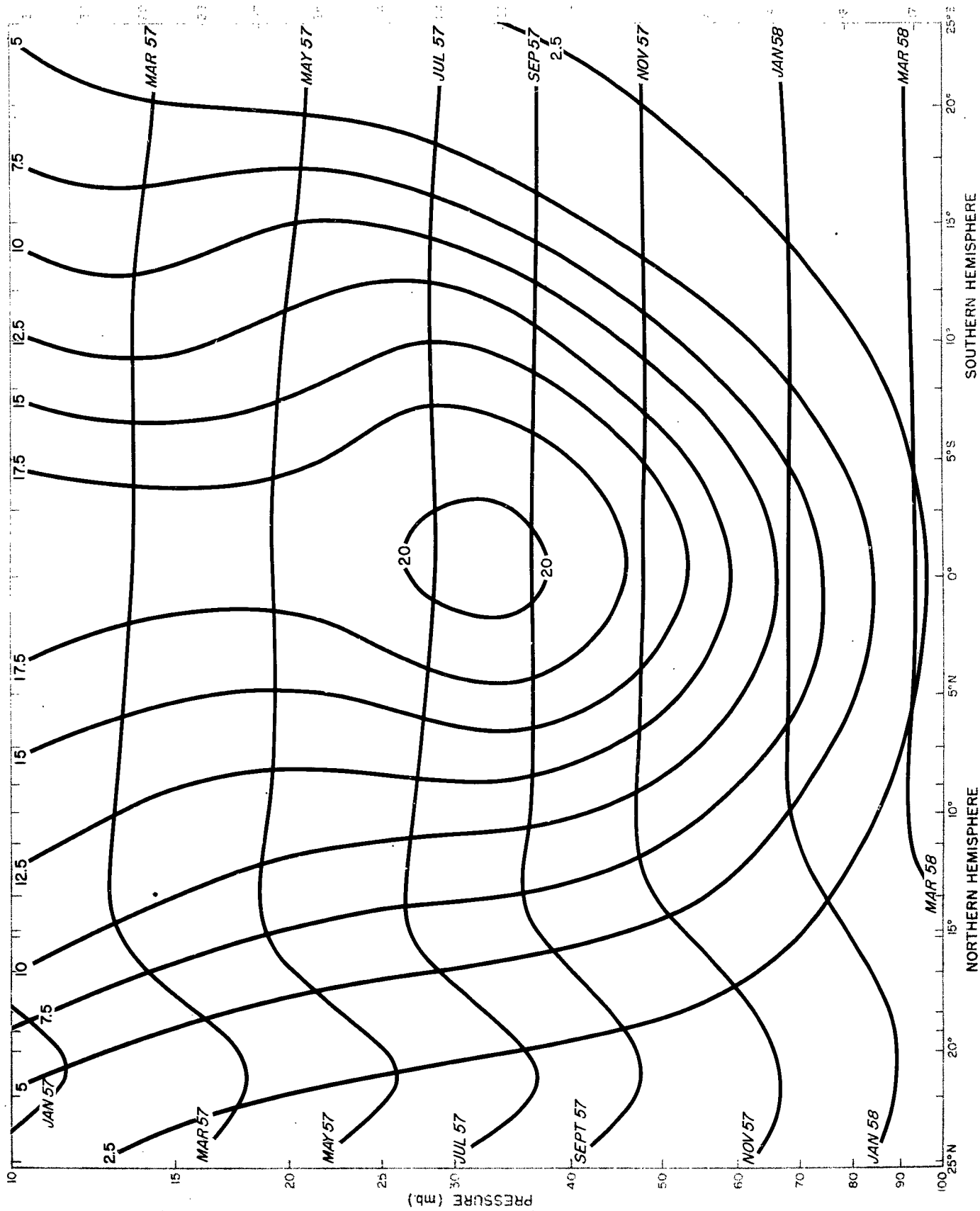


CHART 4.3. PHASE AND AMPLITUDE OF THE 26-MONTH CYCLE OF ZONAL WIND (m./sec.).

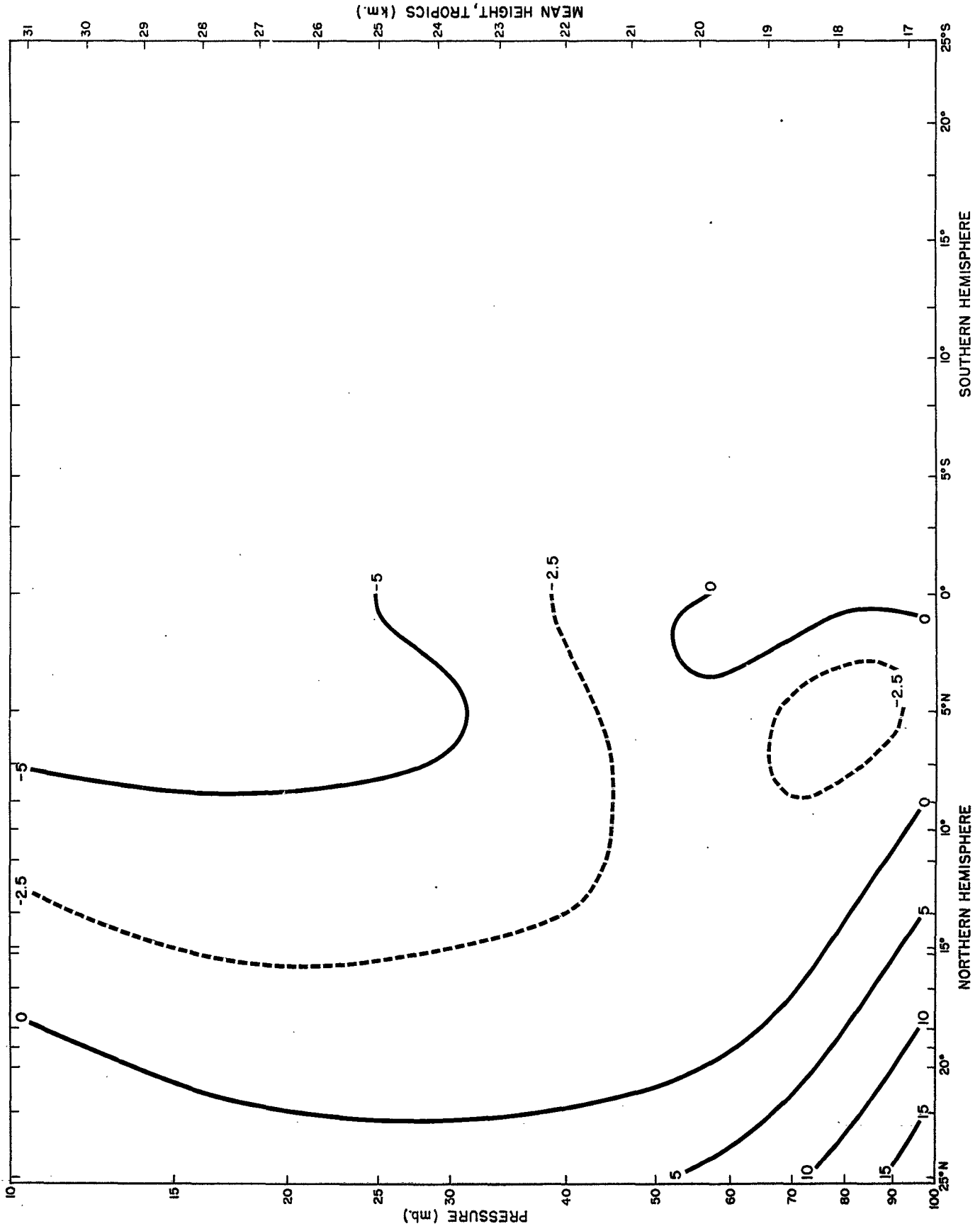


CHART 4.4. MEAN ZONAL WIND, JANUARY (m./sec.).

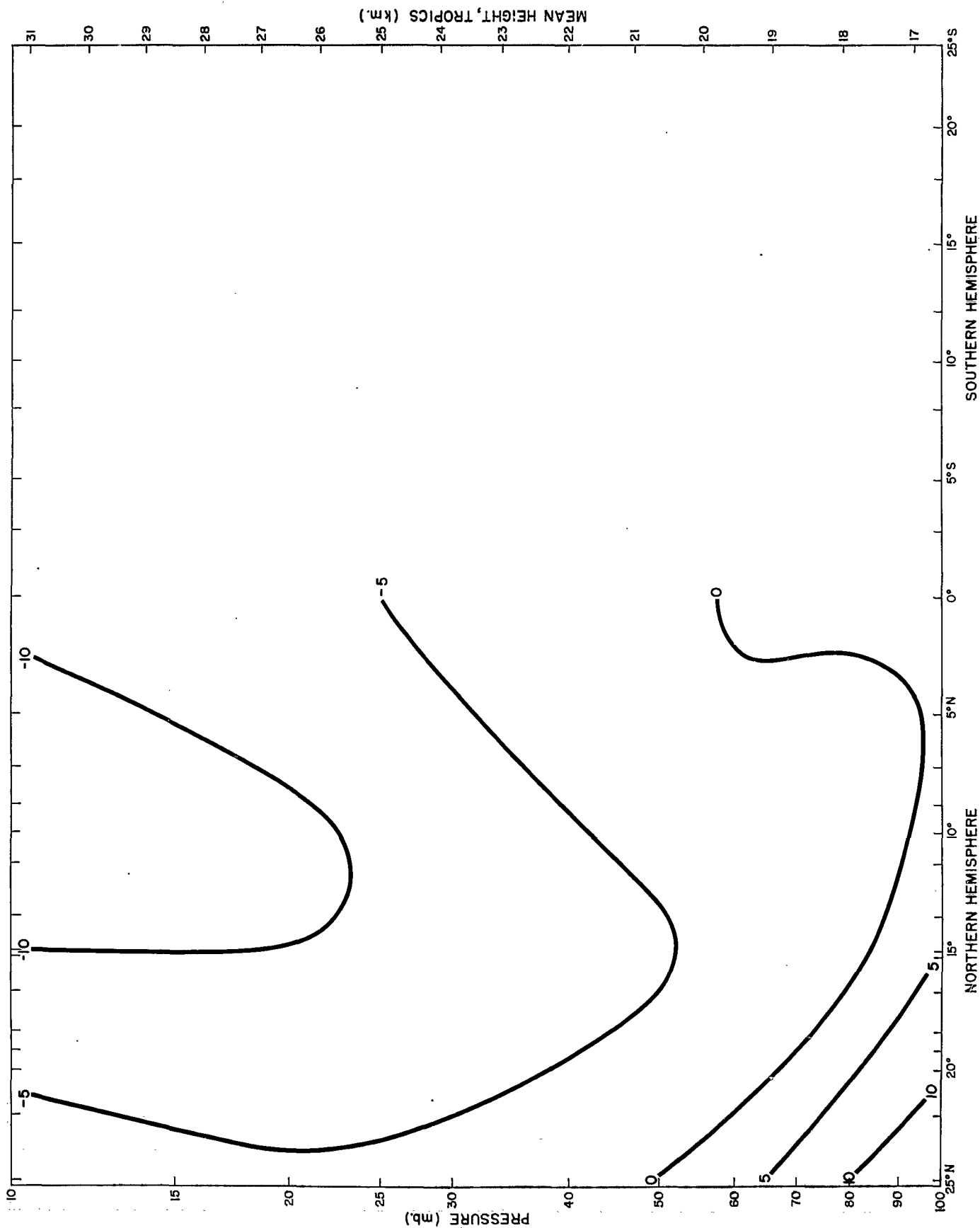


CHART 4.5. MEAN ZONAL WIND, APRIL (m./sec.).



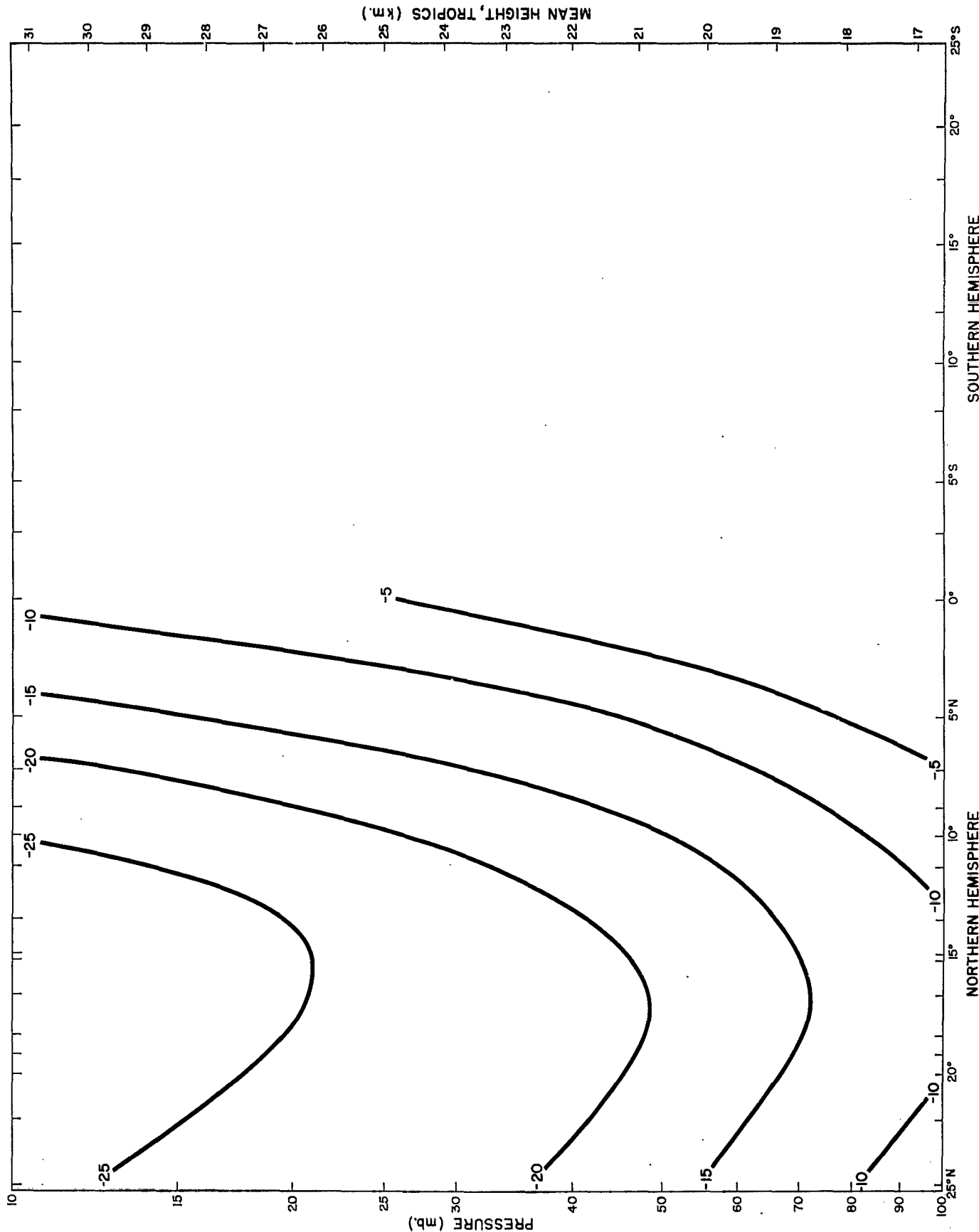


CHART 4.6. MEAN ZONAL WIND, JULY (m./sec.).

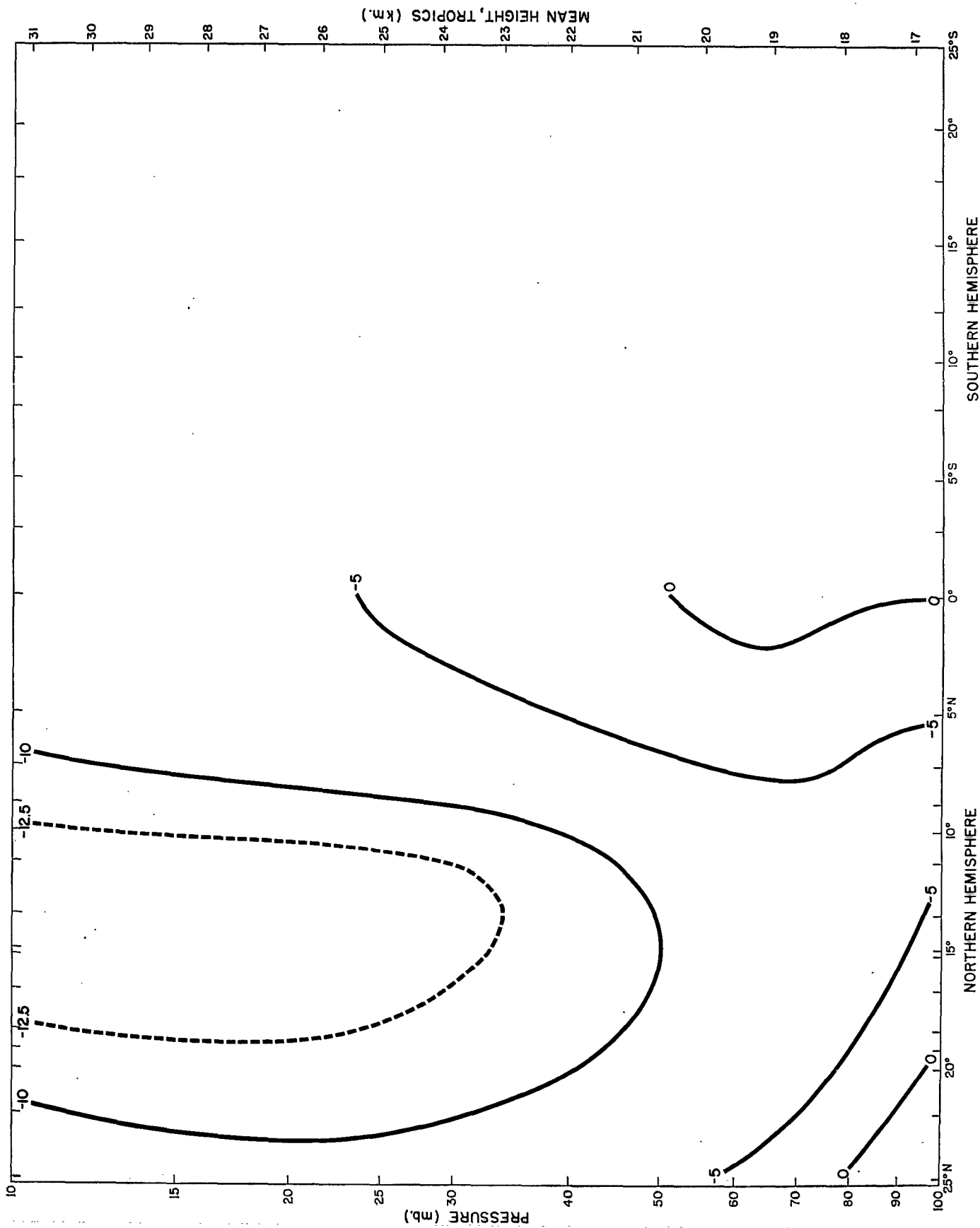


CHART 4.7. MEAN ZONAL WIND, OCTOBER (m./sec.).

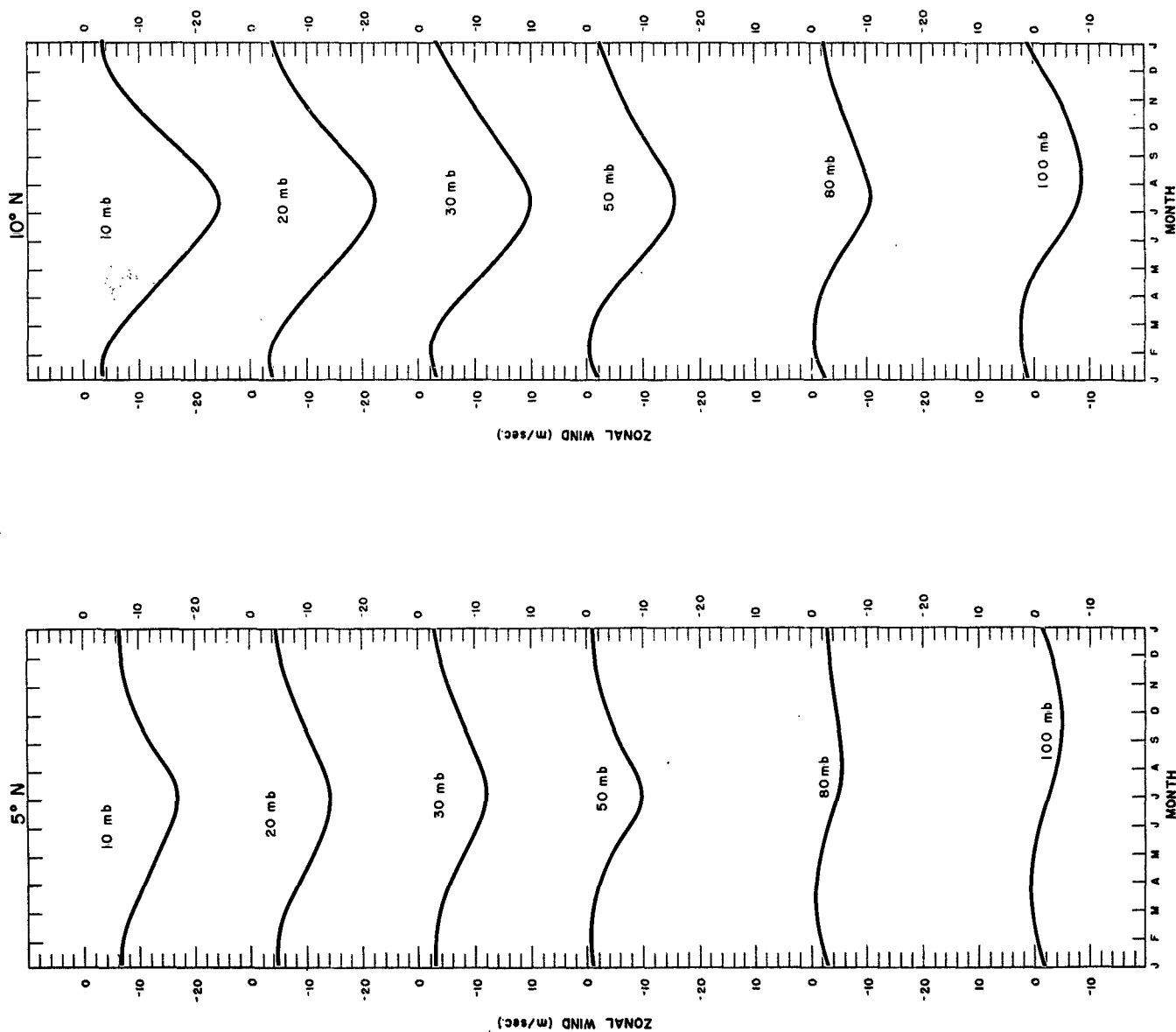


CHART 4.8. ANNUAL WIND CYCLE.

- 15 -

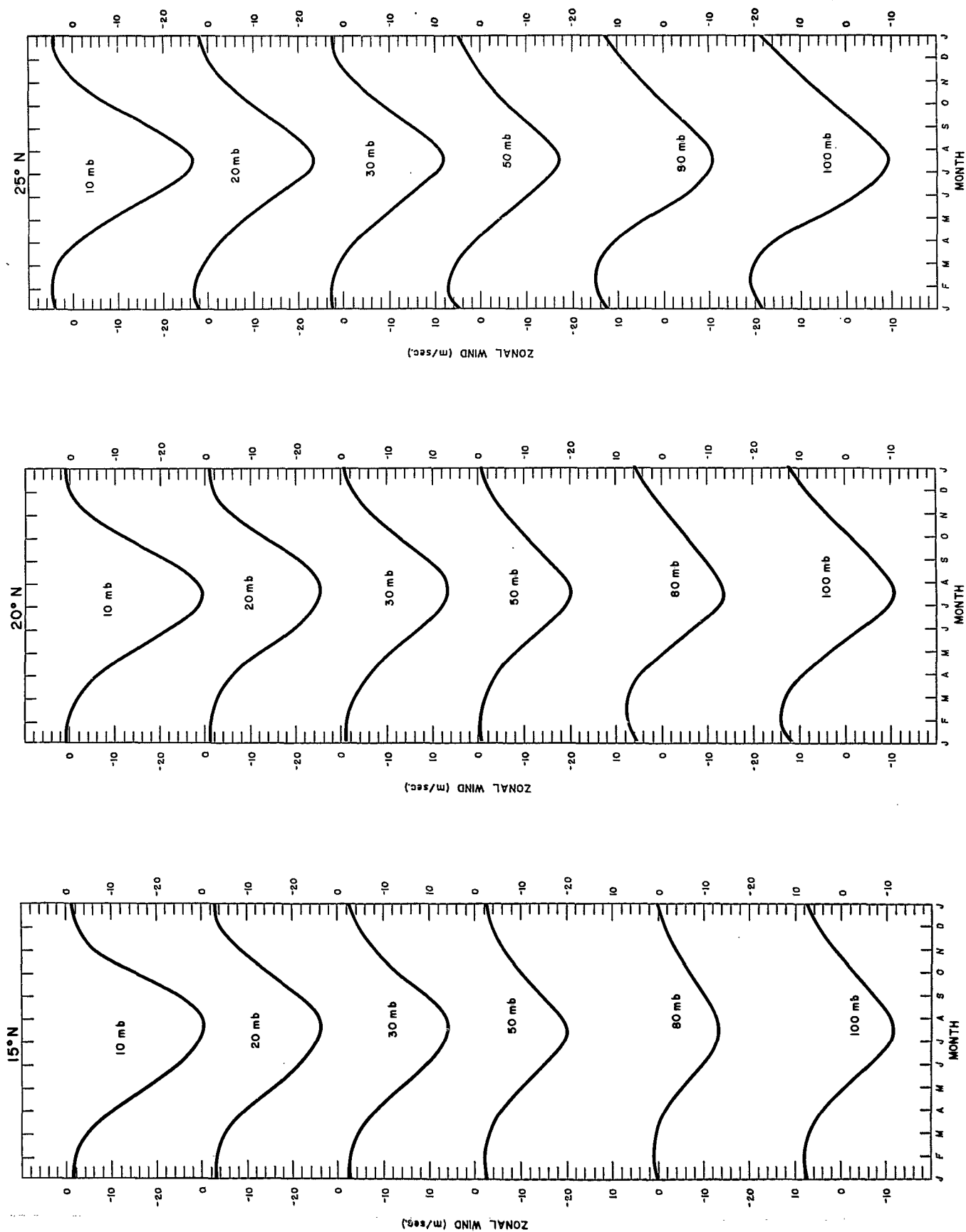


CHART 4.8. ANNUAL WIND CYCLE.

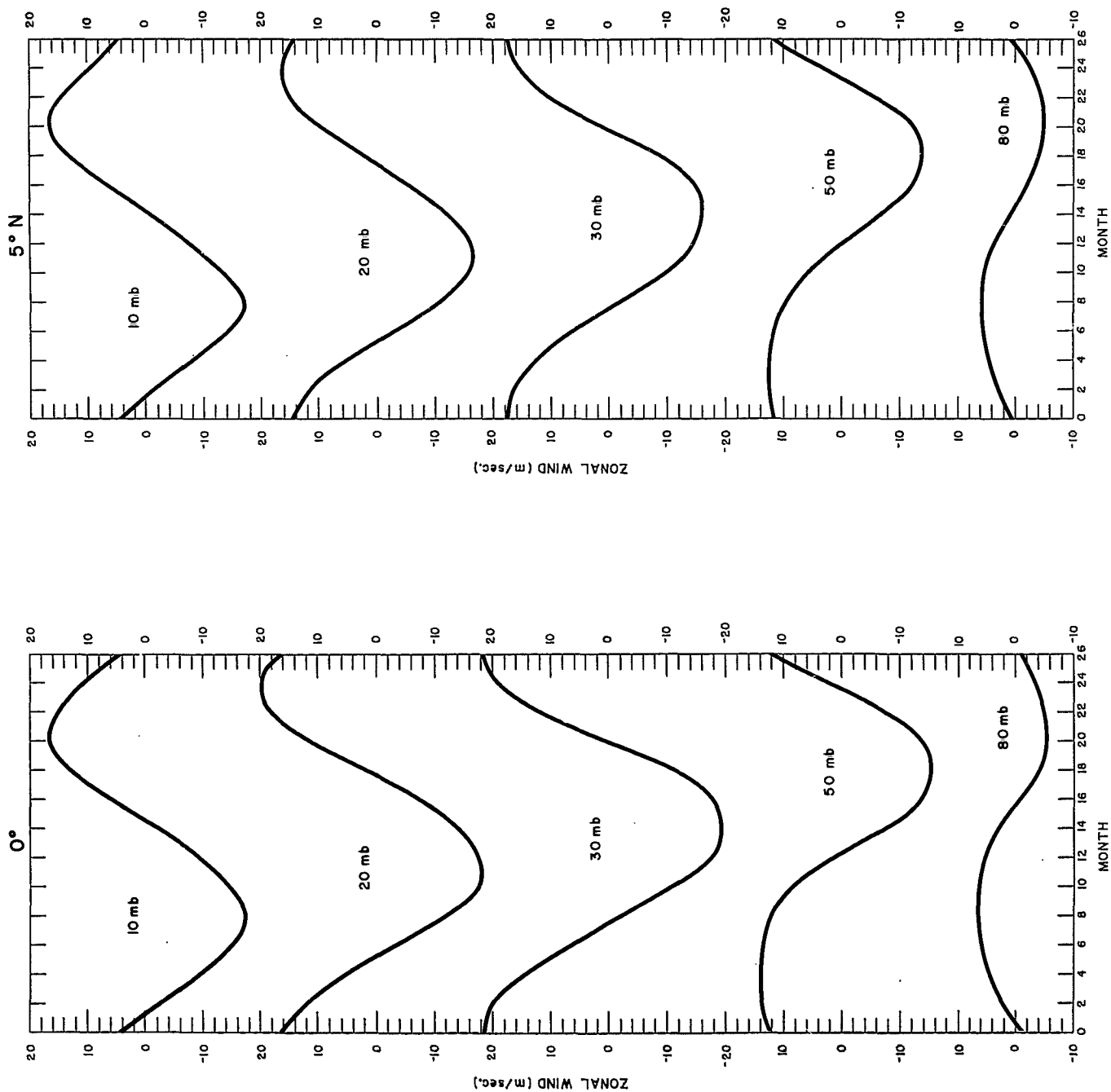


CHART 4.9. THE 26-MONTH WIND CYCLE.

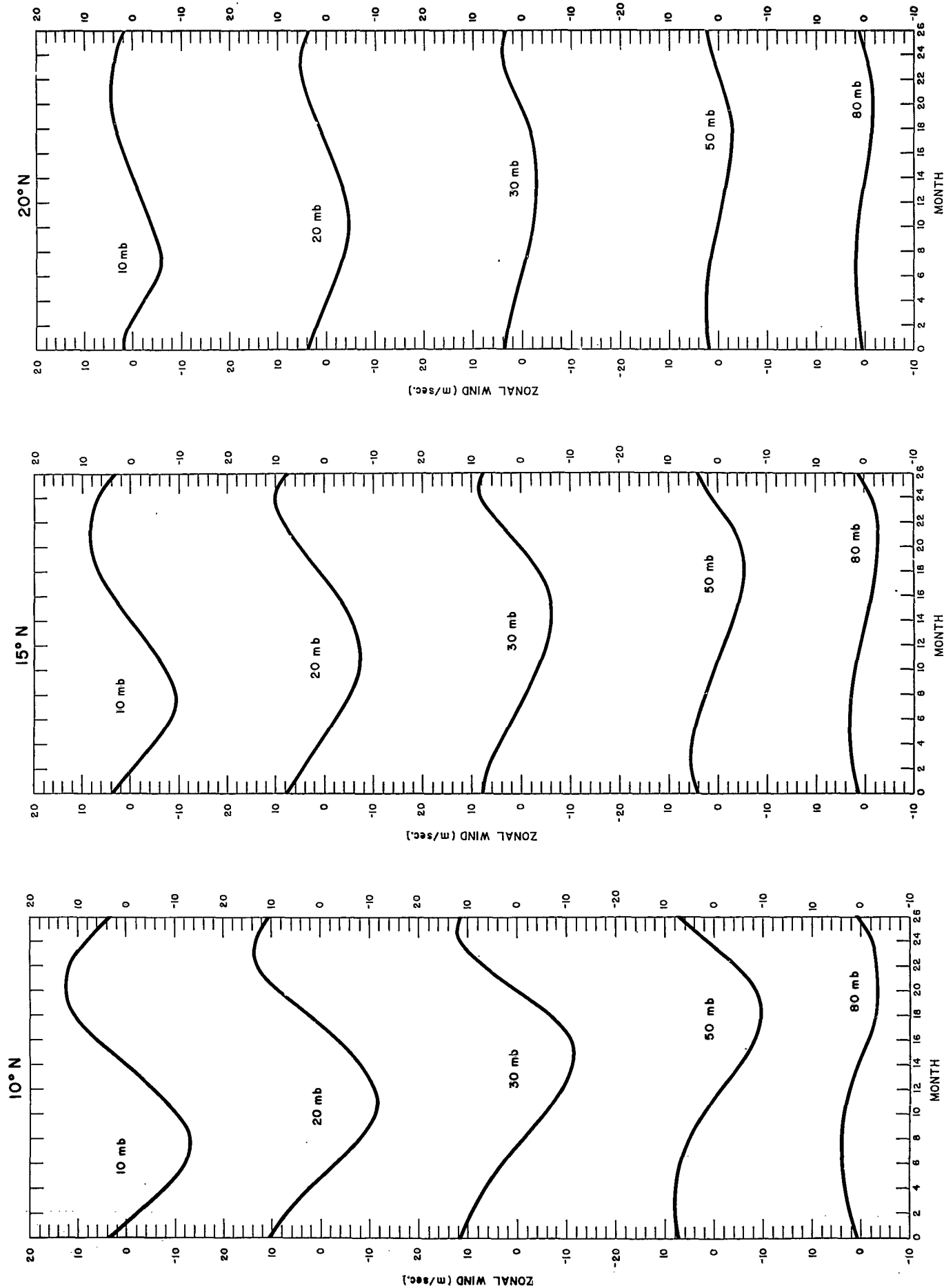


CHART 4.9. THE 26-MONTH WIND CYCLE.

**Table 4.6.** Standard Deviation of the Zonal Wind about Monthly Means (m./sec.).

[illegible]

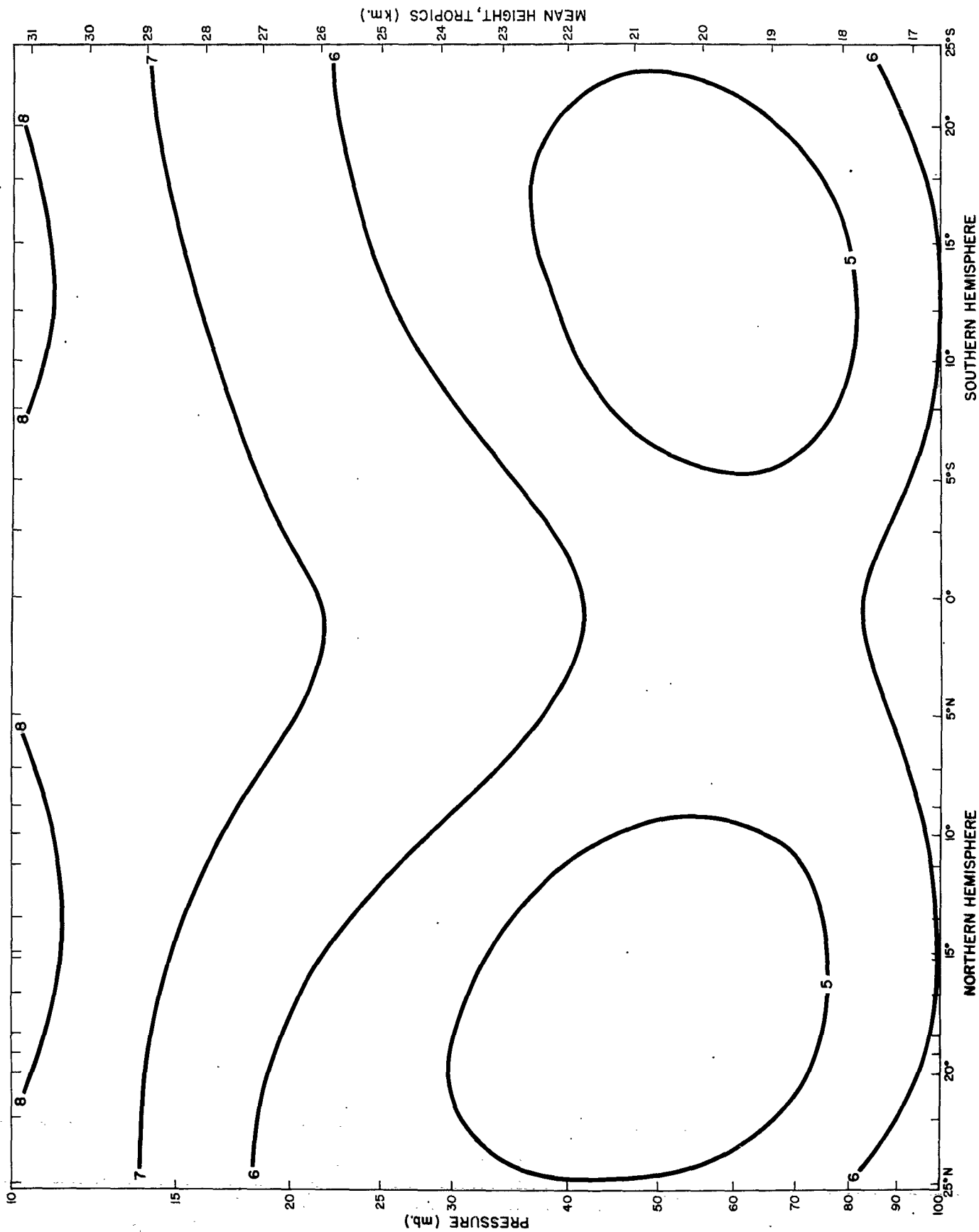


CHART 4.10. STANDARD DEVIATION OF THE ZONAL WIND ABOUT MONTHLY MEANS (m./sec.).



Table 4.7. Standard Deviation of the Meridional Wind about Monthly Means (m./sec.).

| Pressure<br>(mb.) | 25° N. | 20° N. | 15° N. | 10° N. | 5° N. | 0°  | 5° S. | 10° S. | 15° S. | 20° S. | 25° S. | Height<br>(km.) |
|-------------------|--------|--------|--------|--------|-------|-----|-------|--------|--------|--------|--------|-----------------|
| 100               | 6.0    | 5.5    | 5.0    | 5.0    | 4.5   | 4.5 | 4.5   | 5.0    | 5.0    | 5.5    | 6.0    | 16.6            |
| 80                | 5.0    | 4.5    | 4.0    | 4.0    | 4.0   | 4.0 | 4.0   | 4.0    | 4.0    | 4.5    | 5.0    | 17.9            |
| 60                | 4.0    | 3.5    | 3.5    | 3.5    | 3.5   | 3.5 | 3.5   | 3.5    | 3.5    | 3.5    | 4.0    | 19.6            |
| 50                | 4.0    | 3.5    | 3.5    | 3.5    | 3.5   | 3.5 | 3.5   | 3.5    | 3.5    | 3.5    | 4.0    | 20.7            |
| 40                | 3.5    | 3.5    | 3.5    | 3.5    | 4.0   | 4.0 | 4.0   | 3.5    | 3.5    | 3.5    | 3.5    | 22.0            |
| 30                | 3.5    | 3.5    | 3.5    | 4.0    | 4.0   | 4.0 | 4.0   | 4.0    | 3.5    | 3.5    | 3.5    | 23.8            |
| 20                | 4.0    | 4.0    | 4.0    | 4.5    | 4.5   | 4.5 | 4.5   | 4.5    | 4.0    | 4.0    | 4.0    | 26.4            |
| 15                | 4.5    | 4.5    | 4.5    | 4.5    | 4.5   | 4.5 | 4.5   | 4.5    | 4.5    | 4.5    | 4.5    | 28.3            |
| 10                | 5.0    | 5.0    | 5.5    | 5.0    | 5.0   | 4.5 | 5.0   | 5.0    | 5.0    | 5.0    | 5.0    | 31.0            |

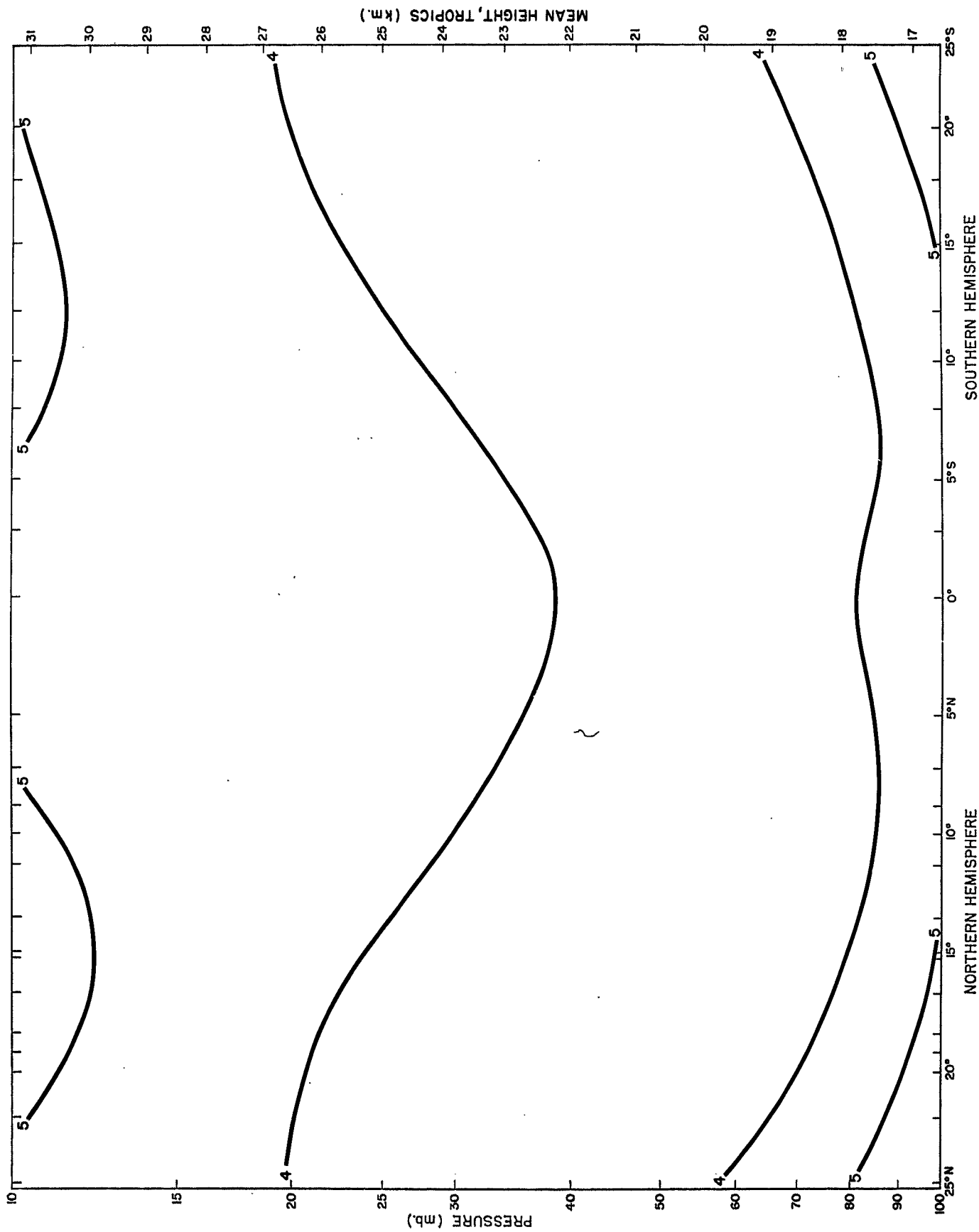


CHART 4.11. STANDARD DEVIATION OF THE MERIDIONAL WIND ABOUT MONTHLY MEANS (m./sec.).

**Table 4.8.** Mean Temperature (°C.).

[illegible]

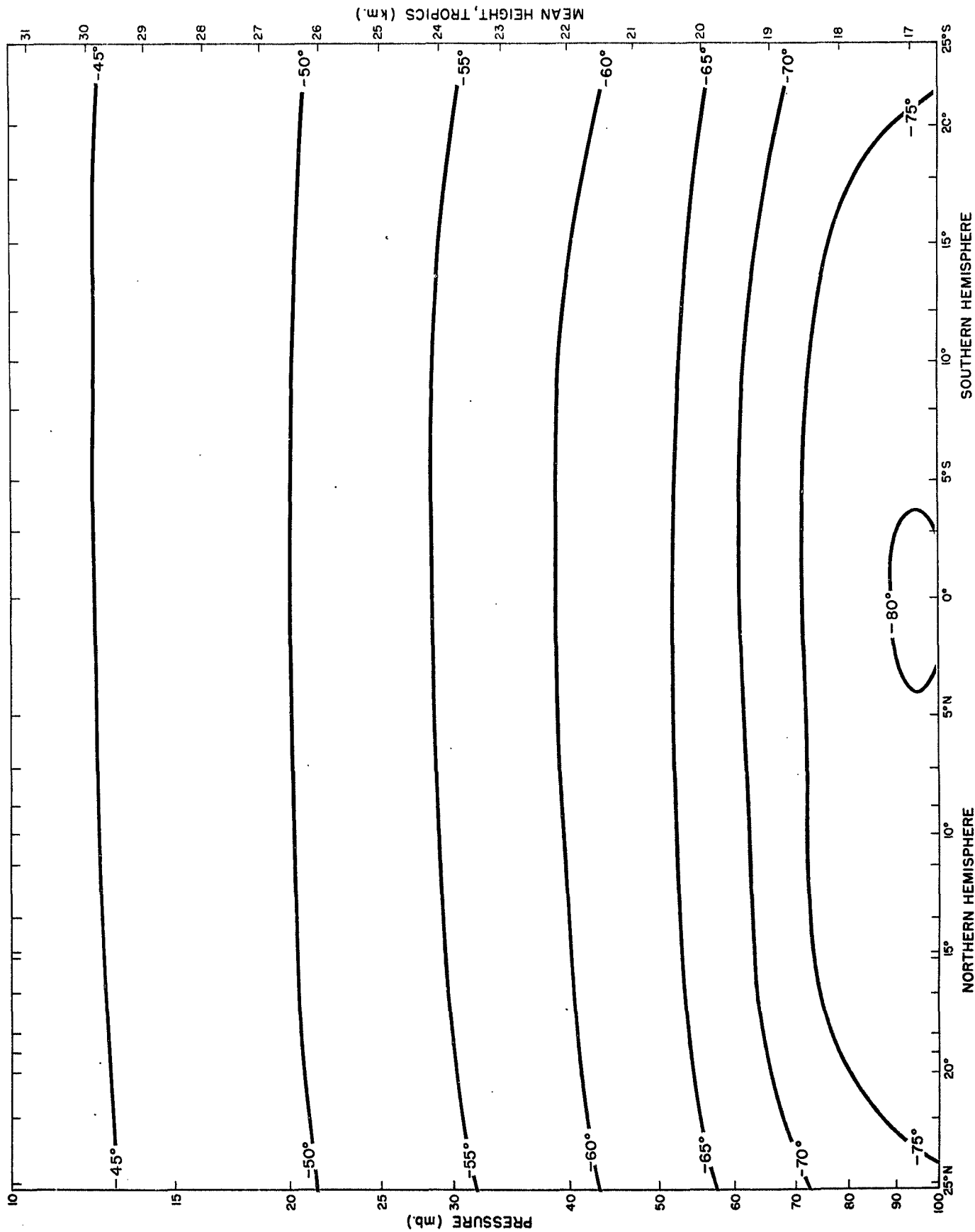


CHART 4.12. MEAN TEMPERATURE (°C).

**Table 4.9. Amplitude of the Annual Temperature Cycle (°C.).**

| Pressure<br>(mb.) | 25° N. | 20° N. | 15° N. | 10° N. | 5° N. | 0°  | Height<br>(km.) |
|-------------------|--------|--------|--------|--------|-------|-----|-----------------|
| 100               | 2.0    | 2.1    | 2.1    | 2.1    | 2.1   | 2.2 | 16.6            |
| 80                | 3.8    | 4.2    | 4.6    | 5.1    | 5.2   | 5.2 | 17.9            |
| 60                | 2.9    | 2.9    | 3.0    | 3.0    | 3.0   | 3.0 | 19.6            |
| 50                | 2.2    | 2.6    | 2.5    | 2.3    | 2.2   | 2.2 | 20.7            |
| 40                | 2.2    | 2.2    | 2.0    | 1.9    | 1.8   | 1.8 | 22.0            |
| 30                | 2.2    | 2.0    | 1.7    | 1.5    | 1.4   | 1.4 | 23.8            |
| 20                | 2.2    | 1.9    | 1.5    | 1.1    | 0.9   | 0.9 | 26.4            |
| 15                | 2.2    | 1.9    | 1.3    | 0.9    | 0.8   | 0.7 | 28.3            |
| 10                | 2.2    | 1.9    | 1.2    | 0.8    | 0.7   | 0.6 | 31.0            |

**Table 4.10.** *Phase of the Annual Temperature Cycle.*

[illegible]

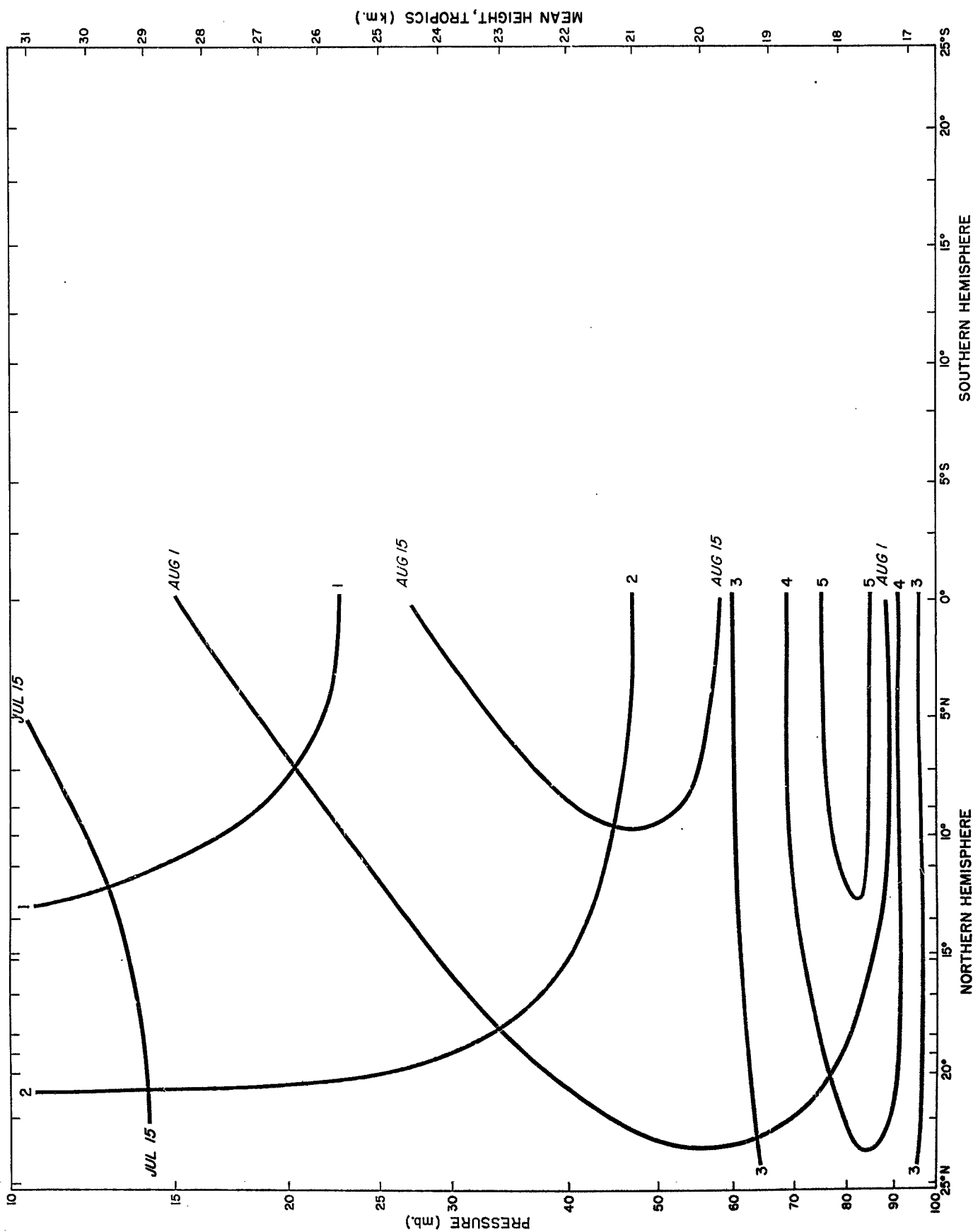


CHART 4.13. PHASE AND AMPLITUDE OF THE ANNUAL TEMPERATURE CYCLE (°C.).

Table 4.11. Amplitude of the 26-Month Temperature Cycle (°C.).

| Pressure<br>(mb.) | 25° N. | 20° N. | 15° N. | 10° N. | 5° N. | 0°  | Height<br>(km.) |
|-------------------|--------|--------|--------|--------|-------|-----|-----------------|
| 100               | 0.2    | 0.2    | -      | 0.4    | 0.7   | 0.9 | 16.6            |
| 80                | 0.3    | 0.2    | -      | 0.6    | 1.1   | 1.5 | 17.9            |
| 60                | 0.4    | 0.3    | -      | 0.7    | 1.3   | 1.7 | 19.6            |
| 50                | 0.6    | 0.4    | -      | 0.8    | 1.5   | 1.8 | 20.7            |
| 40                | 0.7    | 0.4    | -      | 0.8    | 1.5   | 1.9 | 22.0            |
| 30                | 1.0    | 0.5    | -      | 0.9    | 1.6   | 2.0 | 23.8            |
| 20                | 1.2    | 0.6    | -      | 0.9    | 1.7   | 2.1 | 26.4            |
| 15                | 1.3    | 0.7    | -      | 1.0    | 1.8   | 2.2 | 28.3            |
| 10                | 1.3    | 0.7    | -      | 1.0    | 1.8   | 2.2 | 31.0            |

Table 4.12. Phase of the 26-Month Temperature Cycle.

| Pressure<br>(mb.) | 25° N.   | 20° N.   | 15° N. | 10° N.   | 5° N.   | 0°       | Height<br>(km.) |
|-------------------|----------|----------|--------|----------|---------|----------|-----------------|
| 100               | Dec. 58  | Nov. 58  | -      | Jan. 58  | Feb. 58 | Feb. 58  | 16.6            |
| 80                | Oct. 58  | Sept. 58 | -      | Jan. 58  | Jan. 58 | Jan. 58  | 17.9            |
| 60                | July 58  | July 58  | -      | Sept. 57 | Nov. 57 | Nov. 57  | 19.6            |
| 50                | June 58  | June 58  | -      | July 57  | Aug. 57 | Sept. 57 | 20.7            |
| 40                | Apr. 58  | Apr. 58  | -      | June 57  | June 57 | June 57  | 22.0            |
| 30                | Feb. 58  | Feb. 58  | -      | Apr. 57  | Mar. 57 | Mar. 57  | 23.8            |
| 20                | Dec. 57  | Dec. 57  | -      | Feb. 57  | Dec. 56 | Dec. 57  | 26.4            |
| 15                | Nov. 57  | Oct. 57  | -      | Dec. 56  | Oct. 56 | Oct. 56  | 28.3            |
| 10                | Sept. 57 | Aug. 57  | -      | Sept. 56 | Aug. 56 | Aug. 56  | 31.0            |

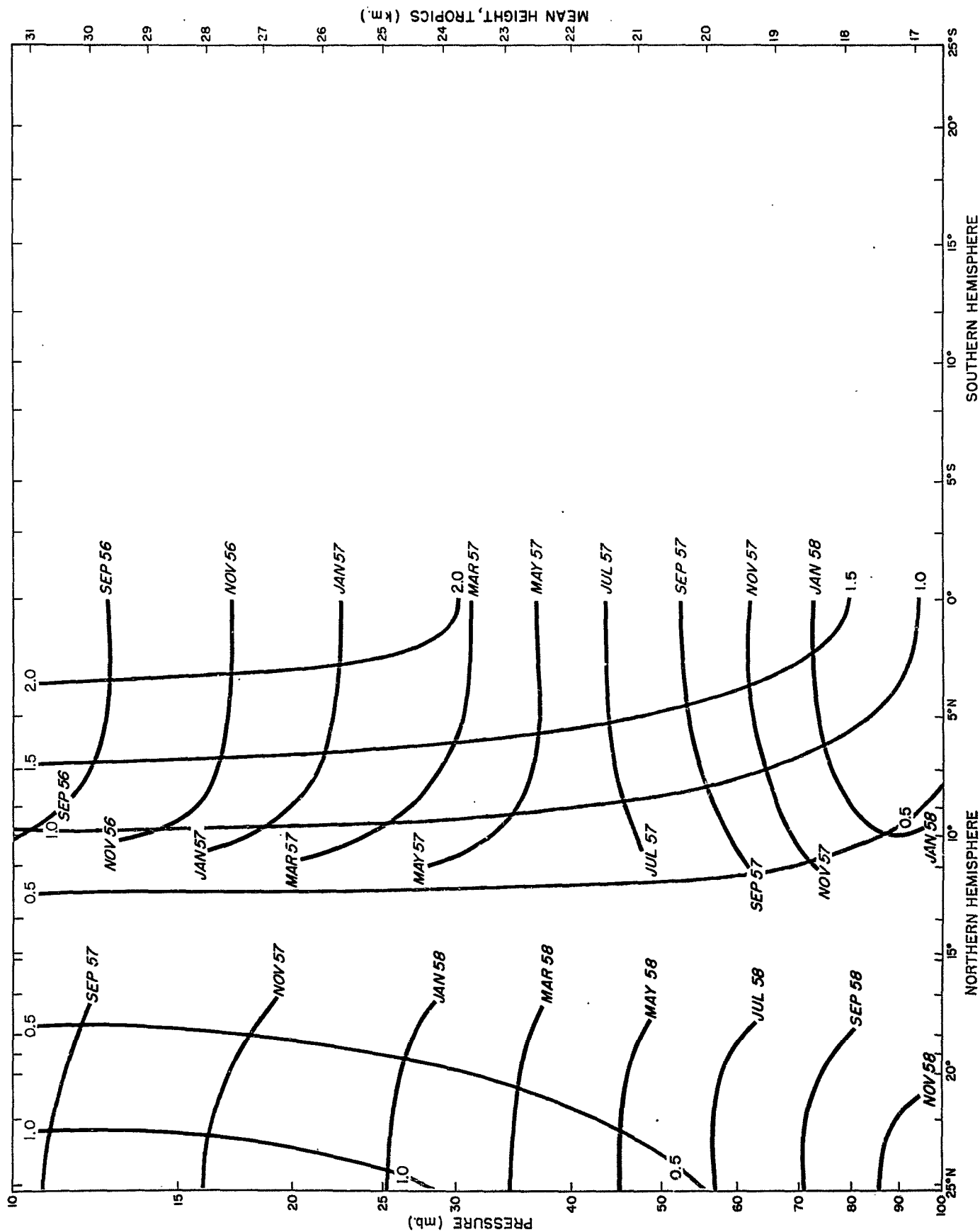


CHART 4.14. PHASE AND AMPLITUDE OF THE 26-MONTH TEMPERATURE CYCLE (°C).



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3. FARKAS, E., "Stratospheric Wind Reversals over the Equatorial and Tropical Southwest Pacific," *Technical Note No. 149*, New Zealand Meteorological Service, 1962.

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3. FARKAS, E., "*Stratospheric Wind Reversals over the Equatorial and Tropical Southwest Pacific.*" *Technical Note No. 149*. New Zealand Meteorological Service. 1962.

## APPENDIX A

### Wind Statistics for Individual Stations

These data are based on 0000 GCT and 1200 GCT reports. The period of record and the number of months of missing data are given at the top of the table. As few as four reports were used in obtaining the monthly averages. Values are in meter per second. Phases of the annual cycle give times of occurrence of maximum west wind to the nearest tenth of a month. (For instance, 4.3 indicates three-tenths of the way through the fourth month, or April 9.) Phases of the 26-month cycle give times of occurrence of maximum west wind to the nearest tenth of a month on the 26-month calendar (see Introduction). Whole numbers refer to middle of months; thus, 0.0 corresponds to July 15, 1957.

Iwo Jima

24°47'N., 141°20'E.

| Level (mb.)           | 100            | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10             |
|-----------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record      | 4/51-<br>12/60 | 4/51-<br>12/60 | 4/51-<br>12/60 | 8/51-<br>12/60 | 8/51-<br>12/60 | 8/51-<br>12/60 | 8/51-<br>12/60 | 8/51-<br>12/60 | 5/54-<br>12/60 |
| Months Missing        | 14             | 19             | 19             | 22             | 23             | 23             | 27             | 39             | 54             |
|                       | Annual Cycle   |                |                |                |                |                |                |                |                |
| January               | 29.0           | 22.4           | 12.4           | 9.0            | 4.6            | 2.1            | 1.4            | -0.5           | 0.1            |
| February              | 30.2           | 22.8           | 16.1           | 10.4           | 6.3            | 3.0            | 2.7            | 3.8            | 6.2            |
| March                 | 27.6           | 20.2           | 10.5           | 6.7            | 3.6            | 1.4            | -0.3           | 1.8            | 3.2            |
| April                 | 18.6           | 13.3           | 7.0            | 0.6            | -2.1           | -3.0           | -2.6           | -1.1           | 0.8            |
| May                   | 7.2            | 2.9            | -3.1           | -4.8           | -6.7           | -8.9           | -9.3           | -10.0          | -9.2           |
| June                  | -3.7           | -6.2           | -9.3           | -11.9          | -13.8          | -16.0          | -17.1          | -17.9          | -18.2          |
| July                  | -12.4          | -13.8          | -15.8          | -17.7          | -19.4          | -21.5          | -23.5          | -24.4          | -26.1          |
| August                | -11.9          | -13.0          | -15.3          | -17.3          | -19.0          | -20.5          | -22.1          | -23.4          | -25.5          |
| September             | -9.3           | -11.1          | -11.4          | -13.5          | -15.2          | -16.2          | -17.7          | -17.7          | -19.5          |
| October               | 1.5            | -1.8           | -4.8           | -6.8           | -7.3           | -7.9           | -8.6           | -7.2           | -5.7           |
| November              | 11.9           | 6.2            | -0.1           | -1.9           | -3.0           | -2.4           | -0.4           | 2.1            | 5.5            |
| December              | 22.1           | 15.2           | 6.3            | 3.4            | 0.8            | -1.2           | -0.7           | -0.6           | 0.4            |
| Mean                  | 9.3            | 4.9            | -0.6           | -3.6           | -5.9           | -7.6           | -8.2           | -7.9           | -7.2           |
| Amplitude             | 20.6           | 17.7           | 15.3           | 12.8           | 11.6           | 11.3           | 11.9           | 12.5           | 14.2           |
| 1st Harmonic<br>Phase | 2.3            | 2.3            | 2.3            | 2.3            | 2.2            | 2.1            | 2.0            | 2.0            | 2.1            |
| Amplitude             | 0.4            | 0.2            | 0.4            | 0.5            | 0.9            | 1.6            | 2.1            | 3.2            | 4.1            |
| 2nd Harmonic<br>Phase | 4.7            | 4.0            | 3.9            | 3.8            | 4.5            | 4.7            | 4.9            | 4.7            | 4.8            |

| Level (mb.)           | 100              | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10             |
|-----------------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record      | 4/51-<br>12/60   | 4/51-<br>12/60 | 4/51-<br>12/60 | 8/51-<br>12/60 | 8/51-<br>12/60 | 8/51-<br>12/60 | 8/51-<br>12/60 | 8/51-<br>12/60 | 5/54-<br>12/60 |
| Months Missing        | 14               | 19             | 19             | 22             | 23             | 23             | 27             | 39             | 54             |
|                       | 26 - Month Cycle |                |                |                |                |                |                |                |                |
| Months                |                  |                |                |                |                |                |                |                |                |
| 0                     | 1.6              | 0.2            | 0.5            | 0.1            | -0.4           | 1.2            | 2.1            | 2.7            | 1.4            |
| 2                     | 0.2              | 0.3            | 1.2            | 1.2            | 0.8            | 0.4            | 0.6            | -0.1           | 1.4            |
| 4                     | -0.8             | 1.0            | 0.2            | 1.3            | -0.9           | -1.5           | -2.0           | -1.9           | -1.3           |
| 6                     | -0.9             | 2.0            | 3.6            | 1.8            | 0.6            | 0.0            | -1.5           | -2.4           | -1.5           |
| 8                     | 1.4              | 2.6            | 5.3            | 3.1            | 2.9            | 2.3            | 2.0            | 2.5            | 1.5            |
| 10                    | 2.3              | -1.3           | -1.8           | -2.1           | -2.6           | -1.6           | -0.8           | -1.0           | -2.5           |
| 12                    | 1.4              | -0.4           | -2.3           | -2.7           | -1.5           | -0.6           | -0.6           | -0.9           | -2.1           |
| 14                    | -0.2             | 0.5            | 0.1            | 0.7            | 1.1            | 0.0            | 0.6            | -0.4           | -0.4           |
| 16                    | -0.7             | -0.2           | -1.0           | -0.6           | 0.0            | 0.3            | -0.2           | 0.8            | -0.2           |
| 18                    | -1.5             | -1.6           | -0.4           | -1.0           | -0.5           | -0.8           | 0.2            | 2.1            | 0.1            |
| 20                    | -2.6             | -3.6           | -3.4           | -2.7           | -2.2           | -2.2           | -3.4           | -6.3           | -6.7           |
| 22                    | 1.0              | 2.0            | 0.4            | 1.2            | 0.8            | -0.5           | 1.8            | 3.4            | 6.0            |
| 24                    | -4.8             | -1.8           | -2.4           | 0.1            | 2.1            | 0.8            | 0.8            | 2.6            | 2.9            |
| Amplitude             | 1.6              | 2.0            | 2.6            | 1.7            | 0.8            | 0.6            | 0.8            | 0.9            | 1.8            |
| 1st Harmonic<br>Phase | 6.5              | 5.0            | 3.9            | 4.3            | 2.7            | 0.7            | 24.1           | 25.3           | 0.1            |
| Amplitude             | 0.5              | 0.6            | 1.4            | 0.5            | 0.2            | 0.5            | 0.9            | 0.8            | 1.6            |
| 2nd Harmonic<br>Phase | 10.9             | 4.7            | 5.0            | -5.1           | 8.5            | 10.2           | 11.0           | 11.9           | 10.6           |

Lihue, Kauai, Hawaiian Islands  
21°59'N., 159°21'W.

| Level (mb.)           | 100            | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10             |
|-----------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record      | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 |
| Months Missing        | 1              | 1              | 1              | 1              | 2              | 4              | 37             | 87             |                |
|                       | Annual Cycle   |                |                |                |                |                |                |                |                |
| January               | 10.9           | 4.7            | -1.2           | -2.0           | -2.9           | -1.8           | -1.2           | 2.3            |                |
| February              | 12.7           | 6.5            | 0.8            | 0.1            | -1.2           | -2.0           | -2.7           | -7.9           |                |
| March                 | 13.6           | 7.8            | 1.4            | -1.0           | -2.2           | -2.6           | -1.5           | -0.2           |                |
| April                 | 11.4           | 5.9            | 0.2            | -2.4           | -4.0           | -5.4           | -2.7           | -1.3           |                |
| May                   | 8.6            | 2.7            | -3.9           | -7.7           | -10.0          | -11.8          | -12.1          | -10.2          |                |
| June                  | 0.4            | -5.4           | -11.0          | -13.6          | -15.9          | -17.8          | -19.2          | -18.0          |                |
| July                  | -2.5           | -9.4           | -15.2          | -18.0          | -20.5          | -22.2          | -23.5          | -25.9          |                |
| August                | -1.2           | -9.0           | -15.0          | -17.2          | -19.5          | -21.7          | -23.9          | -25.2          |                |
| September             | 0.0            | -6.6           | -11.6          | -13.6          | -15.3          | -17.2          | -19.3          | -20.2          |                |
| October               | 2.5            | -2.1           | -6.5           | -7.8           | -9.2           | -10.4          | -11.1          | -7.7           |                |
| November              | 4.5            | 0.3            | -2.8           | -3.3           | -2.3           | -1.0           | 0.5            | 3.0            |                |
| December              | 8.5            | 2.8            | -2.3           | -2.5           | -2.7           | -1.6           | 0.6            | 4.4            |                |
| Mean                  | 5.8            | -0.2           | -5.6           | -7.3           | -8.8           | -9.7           | -9.7           | -9.0           |                |
| Amplitude             | 7.1            | 7.5            | 7.3            | 8.0            | 8.8            | 10.1           | 11.5           | 12.7           |                |
| 1st Harmonic<br>Phase | 2.7            | 2.6            | 2.4            | 2.1            | 2.0            | 1.8            | 1.8            | 1.5            |                |
| Amplitude             | 1.1            | 1.7            | 2.0            | 1.9            | 2.1            | 2.1            | 3.0            | 5.1            |                |
| 2nd Harmonic<br>Phase | 4.2            | 4.6            | 4.7            | 4.7            | 4.8            | 5.1            | 5.2            | 5.5            |                |

| Level (mb.)           | 100              | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10             |
|-----------------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record      | 1/51-<br>12/61   | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 |
| Months Missing        | 1                | 1              | 1              | 1              | 2              | 4              | 37             | 87             |                |
|                       | 26 - Month Cycle |                |                |                |                |                |                |                |                |
| Months                |                  |                |                |                |                |                |                |                |                |
| 0                     | -0.7             | -0.3           | 0.0            | 0.6            | 0.6            | 1.4            | 0.7            | 1.8            |                |
| 2                     | 0.4              | 2.5            | 1.6            | 0.8            | 1.9            | 2.1            | -0.2           | 0.0            |                |
| 4                     | 0.4              | 1.1            | 1.3            | 1.0            | 0.9            | 0.7            | -0.7           | -0.7           |                |
| 6                     | 1.2              | 1.1            | 1.5            | 0.6            | -0.2           | -2.0           | -2.4           | -7.8           |                |
| 8                     | 1.3              | 1.2            | 1.3            | 0.8            | -0.4           | -1.0           | -0.8           | -2.5           |                |
| 10                    | 1.7              | 1.5            | 0.3            | 0.0            | 0.1            | -0.6           | -4.5           | -4.5           |                |
| 12                    | -1.1             | -2.4           | -2.0           | -0.8           | -2.1           | -2.2           | -2.8           | 2.0            |                |
| 14                    | 0.4              | 0.7            | 0.2            | 0.0            | -0.5           | -1.2           | 0.4            | -1.1           |                |
| 16                    | -0.4             | 0.0            | -0.3           | -1.0           | -0.5           | -0.5           | 0.2            | 2.5            |                |
| 18                    | -0.8             | -0.7           | -2.0           | -1.3           | -1.4           | -1.2           | 1.3            | 4.3            |                |
| 20                    | -1.0             | -1.3           | -2.9           | -2.2           | -0.3           | -2.1           | 0.9            | 5.0            |                |
| 22                    | 0.0              | 0.4            | 0.2            | 0.4            | 1.8            | 4.0            | 4.2            | 6.2            |                |
| 24                    | -2.0             | -0.2           | 0.9            | 1.6            | 1.6            | 3.2            | 3.7            | 5.9            |                |
| Amplitude             | 0.6              | 0.7            | 1.4            | 1.2            | 1.6            | 2.2            | 2.9            | 5.1            |                |
| 1st Harmonic<br>Phase | 8.6              | 4.5            | 3.9            | 3.1            | 0.0            | 24.6           | 22.1           | 20.8           |                |
| Amplitude             | 0.5              | 0.6            | 0.4            | 0.4            | 0.3            | 0.9            | 0.6            | 0.3            |                |
| 2nd Harmonic<br>Phase | 4.3              | 2.7            | 1.5            | 0.2            | 1.9            | 11.7           | 11.9           | 12.2           |                |

Wake Island  
19°17'N., 166°39'E.

| Level (mb.)        | 100            | 80             | 60             | 50             | 40             | 30             | 20             | 15              |
|--------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|
| Period of Record   | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 3/51-<br>12/61 | 6/51-<br>12/61 | 12/51-<br>12/61 |
| Months Missing     | 1              | 1              | 2              | 2              | 2              | 5              | 35             | 64              |
|                    | Annual Cycle   |                |                |                |                |                |                |                 |
| January            | 5.8            | 1.2            | -1.6           | -1.7           | -1.7           | -1.1           | -2.4           | 1.5             |
| February           | 9.2            | 4.4            | -0.4           | -0.9           | -2.0           | -2.0           | -2.9           | -4.0            |
| March              | 10.5           | 4.1            | -0.7           | -1.3           | -2.3           | -2.1           | -2.1           | -1.0            |
| April              | 7.5            | 2.2            | -2.5           | -4.1           | -5.4           | -6.7           | -6.0           | -6.3            |
| May                | 4.5            | -0.6           | -5.7           | -8.1           | -10.4          | -12.2          | -13.5          | -13.7           |
| June               | -4.9           | -8.2           | -12.4          | -14.9          | -16.9          | -18.6          | -21.4          | -21.6           |
| July               | -4.5           | -10.6          | -16.2          | -18.5          | -20.7          | -22.8          | -25.2          | -25.3           |
| August             | -5.2           | -11.1          | -15.8          | -17.9          | -19.9          | -21.9          | -25.7          | -24.8           |
| September          | -6.0           | -9.8           | -13.4          | -15.0          | -16.5          | -17.9          | -19.8          | -20.8           |
| October            | -5.6           | -7.7           | -8.8           | -9.7           | -10.4          | -11.2          | -14.0          | -13.3           |
| November           | -3.2           | -5.9           | -6.2           | -6.2           | -5.7           | -4.5           | -5.1           | -1.8            |
| December           | 2.9            | -1.5           | -4.2           | -4.0           | -3.8           | -2.3           | -1.3           | -0.6            |
| Mean               | 0.8            | -3.6           | -7.3           | -8.5           | -9.7           | -10.3          | -11.7          | -11.2           |
| Amplitude          | 7.7            | 7.3            | 7.3            | 8.2            | 9.0            | 10.3           | 11.5           | 12.7            |
| 1st Harmonic Phase | 3.1            | 2.9            | 2.4            | 2.2            | 2.0            | 1.9            | 1.9            | 1.7             |
| Amplitude          | 1.0            | 1.0            | 1.2            | 1.2            | 1.3            | 1.4            | 2.1            | 2.0             |
| 2nd Harmonic Phase | 3.4            | 4.0            | 4.6            | 4.7            | 4.8            | 5.0            | 5.1            | 5.5             |

| Level (mb.)        | 100              | 80             | 60             | 50             | 40             | 30             | 20             | 15              |
|--------------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|
| Period of Record   | 1/51-<br>12/61   | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 3/51-<br>12/61 | 6/51-<br>12/61 | 12/51-<br>12/61 |
| Months Missing     | 1                | 1              | 2              | 2              | 2              | 5              | 35             | 64              |
|                    | 26 - Month Cycle |                |                |                |                |                |                |                 |
| Months             |                  |                |                |                |                |                |                |                 |
| 0                  | -1.1             | 0.0            | 2.1            | 2.3            | 2.6            | 1.7            | 3.7            | 0.8             |
| 2                  | -1.8             | 0.2            | 2.8            | 2.6            | 4.0            | 3.9            | 2.7            | -3.4            |
| 4                  | 0.4              | 0.9            | 1.3            | 2.1            | 2.0            | 1.3            | 1.4            | -1.8            |
| 6                  | 2.6              | 2.8            | 0.8            | 1.5            | 0.8            | -0.5           | 0.0            | -5.5            |
| 8                  | 0.7              | 0.5            | -0.2           | 0.3            | -0.6           | -1.2           | -4.2           | -5.2            |
| 10                 | 0.7              | 0.9            | -0.4           | -0.7           | -1.2           | -1.8           | -4.0           | -5.2            |
| 12                 | 0.2              | -0.9           | -1.5           | -0.4           | -1.6           | -2.7           | -4.1           | -4.4            |
| 14                 | 1.2              | 0.5            | -1.4           | -1.3           | -1.8           | -3.1           | -1.9           | -0.1            |
| 16                 | -1.6             | -1.5           | -1.2           | -1.6           | -1.6           | -2.0           | 0.4            | 0.7             |
| 18                 | -0.9             | -1.2           | -2.1           | -1.9           | -2.0           | -1.8           | 2.8            | 3.2             |
| 20                 | 0.8              | -1.0           | -2.8           | -2.7           | -2.2           | -1.6           | 0.7            | 6.4             |
| 22                 | -0.1             | -0.2           | -0.1           | -0.7           | 0.6            | 3.6            | 4.7            | 6.7             |
| 24                 | -1.4             | -1.2           | 1.8            | 1.1            | 2.3            | 4.4            | 5.2            | 5.6             |
| Amplitude          | 0.7              | 1.3            | 2.2            | 2.2            | 2.5            | 3.3            | 4.7            | 5.4             |
| 1st Harmonic Phase | 9.2              | 5.8            | 1.8            | 2.7            | 0.7            | 25.4           | 23.3           | 21.6            |
| Amplitude          | 0.6              | 0.4            | 0.6            | 0.6            | 0.6            | 0.8            | 0.2            | 0.4             |
| 2nd Harmonic Phase | 6.8              | 5.2            | 0.6            | 1.0            | 0.4            | 10.5           | 1.8            | 7.2             |

San Juan, Puerto Rico  
18°28'N., 66°07'W.

| Level (mb.)           | 100<br>1/51-<br>12/61 | 80<br>1/51-<br>12/61 | 60<br>1/51-<br>12/61 | 50<br>1/51-<br>12/61 | 40<br>2/51-<br>12/61 | 30<br>5/51-<br>12/61 | 20<br>7/51-<br>12/61 | 15<br>12/51-<br>12/61 |
|-----------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|
| Period of Record      | 1/51-<br>12/61        | 1/51-<br>12/61       | 1/51-<br>12/61       | 1/51-<br>12/61       | 2/51-<br>12/61       | 5/51-<br>12/61       | 7/51-<br>12/61       | 12/51-<br>12/61       |
| Months Missing        | 0                     | 0                    | 0                    | 0                    | 1                    | 4                    | 33                   | 70                    |
| Annual Cycle          |                       |                      |                      |                      |                      |                      |                      |                       |
| January               | 9.0                   | 3.5                  | -0.8                 | -0.2                 | -1.1                 | -1.5                 | -1.2                 | -4.7                  |
| February              | 7.9                   | 3.2                  | 0.2                  | -0.2                 | -0.4                 | -1.1                 | -0.8                 | -1.6                  |
| March                 | 8.6                   | 3.8                  | 0.2                  | 0.0                  | -0.8                 | -2.8                 | -3.7                 | -1.8                  |
| April                 | 11.3                  | 4.0                  | -1.8                 | -3.4                 | -5.2                 | -6.6                 | -6.2                 | -6.2                  |
| May                   | 8.3                   | 1.4                  | -5.8                 | -8.5                 | -11.0                | -12.7                | -13.6                | -13.1                 |
| June                  | -0.1                  | -6.1                 | -11.8                | -14.8                | -17.0                | -18.8                | -20.1                | -17.3                 |
| July                  | -7.4                  | -12.7                | -17.0                | -18.7                | -20.8                | -22.6                | -25.1                | -25.3                 |
| August                | -8.0                  | -12.8                | -16.4                | -18.1                | -19.8                | -21.5                | -24.0                | -23.1                 |
| September             | -5.2                  | -9.4                 | -12.9                | -14.3                | -16.0                | -18.1                | -19.9                | -18.3                 |
| October               | 0.1                   | -3.2                 | -7.2                 | -8.9                 | -11.0                | -12.9                | -14.7                | -12.5                 |
| November              | 6.3                   | 1.4                  | -1.3                 | -2.4                 | -4.1                 | -5.6                 | -5.8                 | -4.5                  |
| December              | 8.3                   | 1.7                  | -1.2                 | -1.5                 | -1.5                 | -2.5                 | -3.4                 | -3.9                  |
| Mean                  | 3.3                   | -2.1                 | -6.3                 | -7.6                 | -9.1                 | -10.6                | -11.5                | -10.9                 |
| Amplitude             | 8.0                   | 7.7                  | 8.0                  | 9.0                  | 9.7                  | 10.2                 | 11.4                 | 10.1                  |
| 1st Harmonic<br>Phase | 2.6                   | 2.4                  | 2.1                  | 2.0                  | 1.9                  | 1.9                  | 2.0                  | 2.0                   |
| Amplitude             | 2.9                   | 2.4                  | 1.9                  | 1.5                  | 1.3                  | 1.0                  | 1.1                  | 2.2                   |
| 2nd Harmonic<br>Phase | 5.2                   | 5.1                  | 5.0                  | 4.9                  | 4.8                  | 4.8                  | 4.8                  | 4.8                   |

| Level (mb.)           | 100<br>1/51-<br>12/61 | 80<br>1/51-<br>12/61 | 60<br>1/51-<br>12/61 | 50<br>1/51-<br>12/61 | 40<br>2/51-<br>12/61 | 30<br>5/51-<br>12/61 | 20<br>7/51-<br>12/61 | 15<br>12/51-<br>12/61 |
|-----------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|
| Period of Record      | 1/51-<br>12/61        | 1/51-<br>12/61       | 1/51-<br>12/61       | 1/51-<br>12/61       | 2/51-<br>12/61       | 5/51-<br>12/61       | 7/51-<br>12/61       | 12/51-<br>12/61       |
| Months Missing        | 0                     | 0                    | 0                    | 0                    | 1                    | 4                    | 33                   | 70                    |
| 26 - Month Cycle      |                       |                      |                      |                      |                      |                      |                      |                       |
| Months                | 0                     | 1.6                  | 2.2                  | 4.5                  | 4.7                  | 5.5                  | 6.4                  | 3.2                   |
| 2                     | 0.7                   | 1.8                  | 2.6                  | 3.4                  | 4.1                  | 3.6                  | 2.5                  | 1.3                   |
| 4                     | 0.1                   | 0.8                  | 1.6                  | 1.2                  | 1.9                  | 1.0                  | -4.1                 | -5.3                  |
| 6                     | 1.3                   | 1.8                  | 1.8                  | 1.1                  | 0.3                  | -1.0                 | -4.7                 | -7.6                  |
| 8                     | 2.7                   | 2.1                  | 0.7                  | 0.4                  | -0.5                 | -1.1                 | -2.6                 | -7.5                  |
| 10                    | 0.3                   | 1.0                  | 0.9                  | 0.4                  | -0.5                 | -1.6                 | -5.4                 | -8.0                  |
| 12                    | 0.8                   | 0.4                  | -0.3                 | -1.1                 | -2.2                 | -3.9                 | -5.6                 | -4.0                  |
| 14                    | -0.2                  | 0.2                  | -0.2                 | -1.3                 | -2.3                 | -3.6                 | -4.1                 | -2.9                  |
| 16                    | -1.8                  | -1.3                 | -2.2                 | -2.7                 | -3.1                 | -3.7                 | -3.4                 | 1.4                   |
| 18                    | -1.0                  | -2.7                 | -3.7                 | -3.8                 | -3.6                 | -2.5                 | -2.7                 | 3.7                   |
| 20                    | -2.7                  | -3.4                 | -3.5                 | -3.0                 | -2.3                 | -0.5                 | 7.0                  | 8.4                   |
| 22                    | -1.0                  | -2.4                 | 0.0                  | 0.3                  | 1.4                  | 4.4                  | 7.7                  | 8.8                   |
| 24                    | -1.4                  | -1.5                 | 0.2                  | 1.8                  | 3.8                  | 5.4                  | 7.6                  | 11.3                  |
| Amplitude             | 1.4                   | 1.9                  | 2.3                  | 2.8                  | 3.4                  | 4.2                  | 6.1                  | 7.2                   |
| 1st Harmonic<br>Phase | 6.5                   | 5.9                  | 4.2                  | 2.7                  | 1.8                  | 25.9                 | 23.6                 | 21.8                  |
| Amplitude             | 0.6                   | 0.6                  | 1.0                  | 1.3                  | 1.6                  | 1.7                  | 2.3                  | 1.2                   |
| 2nd Harmonic<br>Phase | 0.0                   | 0.4                  | 12.7                 | 12.6                 | 12.3                 | 11.2                 | 10.3                 | 9.5                   |

Nandi, Fiji Islands  
17°45' S., 122°27' E.

| Level (mb.)                        | 100           | 70            | 50            | 30            | 20            | 15            |
|------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Period of Record                   | 1/56-<br>7/62 | 1/56<br>-7/62 | 1/51-<br>7/62 | 6/52-<br>7/62 | 3/57-<br>7/62 | 3/57-<br>7/62 |
| Months Missing                     | 0             | 0             | 4             | 5             | 2             | 2             |
|                                    | Annual Cycle  |               |               |               |               |               |
| January                            | 2.7           | -7.5          | -15.3         | -18.6         | -22.6         | -22.8         |
| February                           | 1.9           | -7.3          | -16.1         | -21.2         | -24.7         | -27.5         |
| March                              | 3.2           | -6.7          | -15.6         | -20.2         | -23.9         | -23.1         |
| April                              | 9.6           | -0.7          | -10.0         | -14.0         | -15.9         | -14.4         |
| May                                | 13.8          | 3.1           | -4.6          | -6.3          | -5.3          | -2.8          |
| June                               | 11.1          | 3.7           | -1.4          | -0.8          | 1.2           | -3.5          |
| July                               | 12.7          | 6.6           | 1.4           | -0.4          | 3.0           | -4.8          |
| August                             | 12.5          | 5.4           | -0.6          | -4.6          | -1.9          | 0.0           |
| September                          | 11.7          | 3.4           | -3.6          | -7.8          | -7.2          | -5.6          |
| October                            | 10.3          | 0.2           | -7.1          | -10.4         | -8.6          | -6.1          |
| November                           | 10.2          | -2.3          | -9.3          | -13.1         | -11.6         | -9.4          |
| December                           | 10.0          | -2.7          | -12.1         | -14.7         | -15.0         | -16.0         |
| Mean                               | 9.1           | -0.3          | -7.8          | -11.0         | -11.0         | -10.0         |
| Amplitude<br>1st Harmonic<br>Phase | 4.9           | 6.4           | 7.8           | 8.7           | 11.8          | 13.1          |
|                                    | 8.4           | 8.0           | 8.0           | 7.9           | 8.1           | 8.1           |
| Amplitude<br>2nd Harmonic<br>Phase | 2.3           | 0.9           | 1.1           | 2.5           | 3.3           | 3.8           |
|                                    | 5.5           | 5.9           | 6.5           | 6.4           | 6.3           | 6.1           |

| Level (mb.)                        | 100              | 70            | 50            | 30            | 20            | 15            |
|------------------------------------|------------------|---------------|---------------|---------------|---------------|---------------|
| Period of Record                   | 1/56-<br>7/62    | 1/56<br>-7/62 | 1/51-<br>7/62 | 6/52-<br>7/62 | 3/57-<br>7/62 | 3/57-<br>7/62 |
| Months Missing                     | 0                | 0             | 4             | 5             | 2             | 2             |
|                                    | 26 - Month Cycle |               |               |               |               |               |
| Months                             |                  |               |               |               |               |               |
| 0                                  | 0.2              | 0.8           | 2.8           | 4.8           | 4.0           | 6.7           |
| 2                                  | 1.6              | 1.4           | 2.7           | 2.7           | 1.6           | -2.0          |
| 4                                  | 1.4              | 2.3           | 2.2           | 2.9           | 1.3           | -1.7          |
| 6                                  | -1.9             | -0.3          | 1.9           | 2.2           | -0.8          | -0.3          |
| 8                                  | -0.7             | -0.6          | 1.4           | -0.1          | -3.8          | -6.3          |
| 10                                 | -0.2             | -0.1          | 2.0           | 0.1           | -4.5          | -6.5          |
| 12                                 | -0.6             | -1.3          | -1.1          | -3.3          | -4.3          | -5.9          |
| 14                                 | 1.2              | 0.0           | -1.3          | -5.4          | -4.6          | -2.6          |
| 16                                 | 0.3              | -0.4          | -3.4          | -5.2          | -4.8          | 0.1           |
| 18                                 | -1.9             | -3.0          | -3.6          | -1.5          | -0.3          | 1.6           |
| 20                                 | 1.6              | 0.1           | -3.4          | -1.8          | 2.0           | 1.8           |
| 22                                 | -0.2             | 0.9           | -3.0          | -0.3          | 3.6           | 5.0           |
| 24                                 | -0.9             | 0.0           | 1.2           | 4.4           | 8.7           | 8.9           |
| Amplitude<br>1st Harmonic<br>Phase | 0.1              | 1.6           | 3.2           | 3.9           | 5.3           | 6.3           |
|                                    | 1.0              | 3.9           | 4.3           | 1.8           | 23.7          | 22.2          |
| Amplitude<br>2nd Harmonic<br>Phase | 0.3              | 0.3           | 0.8           | 0.6           | 0.9           | 1.4           |
|                                    | 0.8              | 3.2           | 0.2           | 11.3          | 9.2           | 10.5          |



| Level (mb.)                        | 100<br>1/51-<br>12/61 | 80<br>2/51-<br>12/61 | 60<br>3/51-<br>12/61 | 50<br>4/51-<br>12/61 | 40<br>5/51-<br>12/61 | 30<br>6/51-<br>12/61 | 20<br>7/51-<br>12/61 | 15<br>8/51-<br>12/61 | 10<br>9/51-<br>4/60 |
|------------------------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|
| Period of Record                   |                       |                      |                      |                      |                      |                      |                      |                      |                     |
| Months Missing                     | 1                     | 3                    | 6                    | 8                    | 8                    | 8                    | 15                   | 40                   | 44                  |
|                                    | Annual Cycle          |                      |                      |                      |                      |                      |                      |                      |                     |
| January                            | 7.3                   | 2.5                  | -1.0                 | -1.5                 | -1.1                 | -1.0                 | 0.1                  | 0.7                  | 3.4                 |
| February                           | 9.4                   | 3.9                  | 0.4                  | -0.2                 | -1.3                 | -1.6                 | -0.3                 | 2.2                  | 5.1                 |
| March                              | 14.0                  | 6.3                  | 1.2                  | -0.6                 | -1.4                 | -2.7                 | -1.2                 | 2.2                  | 1.5                 |
| April                              | 15.2                  | 7.0                  | 0.4                  | -2.0                 | -4.7                 | -6.4                 | -6.7                 | -8.1                 | -9.1                |
| May                                | 12.3                  | 3.7                  | -4.5                 | -7.3                 | -10.8                | -11.8                | -12.8                | -12.9                | -12.2               |
| June                               | 2.5                   | -5.3                 | -11.5                | -13.9                | -15.8                | -17.8                | -20.2                | -22.8                | -25.3               |
| July                               | 0.4                   | -7.5                 | -14.0                | -16.6                | -17.9                | -20.6                | -23.1                | -25.2                | -29.8               |
| August                             | -1.3                  | -9.4                 | -14.0                | -16.1                | -17.9                | -19.4                | -22.1                | -25.4                | -31.3               |
| September                          | -0.9                  | -7.0                 | -11.7                | -12.9                | -14.0                | -16.4                | -19.6                | -22.4                | -28.6               |
| October                            | 3.4                   | -2.5                 | -7.0                 | -8.6                 | -10.4                | -11.5                | -12.8                | -13.8                | -12.6               |
| November                           | 2.0                   | -1.8                 | -4.3                 | -5.4                 | -5.9                 | -6.5                 | -6.4                 | -4.8                 | -1.5                |
| December                           | 4.6                   | -0.4                 | -2.8                 | -3.4                 | -2.8                 | -2.5                 | -0.8                 | 0.8                  | 1.8                 |
| Mean                               | 5.7                   | -1.0                 | -5.7                 | -7.4                 | -8.7                 | -9.9                 | -10.5                | -10.9                | -11.7               |
| Amplitude<br>1st Harmonic<br>Phase | 6.6                   | 6.6                  | 7.0                  | 7.6                  | 8.2                  | 9.2                  | 11.3                 | 13.7                 | 17.3                |
| Amplitude<br>2nd Harmonic<br>Phase | 3.5                   | 3.0                  | 2.5                  | 2.3                  | 2.0                  | 1.9                  | 1.9                  | 1.9                  | 2.0                 |
| Amplitude                          | 2.1                   | 1.9                  | 1.6                  | 1.4                  | 0.8                  | 0.7                  | 0.8                  | 1.1                  | 2.0                 |
| Phase                              | 4.6                   | 4.6                  | 4.6                  | 4.4                  | 4.5                  | 4.8                  | 5.1                  | 5.0                  | 5.4                 |

Clark AFB, Philippines  
15°16'N., 121°28'E.

| Level (mb.)           | 100            | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10             |
|-----------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record      | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 |
| Months Missing        | 1              | 0              | 0              | 0              | 0              | 0              | 1              | 15             | 44             |
|                       | Annual Cycle   |                |                |                |                |                |                |                |                |
| January               | 1.1            | 0.3            | 0.7            | 0.0            | -1.3           | -2.0           | -2.8           | -2.4           | -3.5           |
| February              | 1.4            | 0.3            | 1.7            | 1.1            | -0.9           | -2.4           | -3.3           | -3.4           | -3.2           |
| March                 | 2.4            | 0.0            | 0.4            | 0.0            | -1.1           | -2.6           | -2.8           | -4.2           | -3.9           |
| April                 | -0.9           | -3.5           | -3.2           | -3.7           | -5.2           | -6.5           | -8.1           | -7.8           | -8.9           |
| May                   | -9.1           | -10.4          | -10.0          | -10.4          | -11.6          | -13.8          | -16.9          | -17.6          | -18.2          |
| June                  | -16.5          | -15.7          | -15.0          | -16.5          | -17.7          | -19.5          | -21.7          | -22.8          | -28.0          |
| July                  | -19.2          | -18.6          | -19.8          | -20.5          | -21.8          | -23.7          | -25.7          | -26.9          | -32.4          |
| August                | -18.6          | -18.7          | -18.8          | -20.0          | -21.4          | -23.0          | -26.1          | -29.5          | -32.0          |
| September             | -17.1          | -15.7          | -15.1          | -16.1          | -17.1          | -18.8          | -21.6          | -21.1          | -22.7          |
| October               | -9.4           | -9.1           | -9.4           | -10.4          | -11.5          | -13.1          | -14.2          | -15.8          | -15.4          |
| November              | -7.2           | -7.2           | -5.8           | -6.6           | -8.2           | -8.8           | -8.6           | -7.8           | -7.8           |
| December              | -1.3           | -2.8           | -2.2           | -2.8           | -4.1           | -4.7           | -3.0           | -3.7           | -1.8           |
| Mean                  | -7.7           | -8.4           | -8.0           | -8.8           | -10.2          | -11.6          | -12.9          | -13.6          | -14.8          |
| Amplitude             | 10.3           | 9.3            | 9.8            | 10.0           | 9.8            | 10.3           | 11.4           | 12.3           | 14.1           |
| 1st Harmonic<br>Phase | 2.2            | 2.1            | 2.1            | 2.2            | 2.1            | 2.0            | 1.9            | 1.9            | 1.7            |
| Amplitude             | 1.2            | 0.9            | 1.1            | 1.1            | 1.2            | 1.1            | 1.2            | 1.5            | 2.6            |
| 2nd Harmonic<br>Phase | 4.4            | 4.3            | 4.3            | 4.3            | 4.4            | 4.5            | 5.0            | 5.0            | 4.8            |

| Level (mb.)           | 100              | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10             |
|-----------------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record      | 1/51-<br>12/61   | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 |
| Months Missing        | 1                | 0              | 0              | 0              | 0              | 0              | 1              | 15             | 44             |
|                       | 26 - Month Cycle |                |                |                |                |                |                |                |                |
| Months                |                  |                |                |                |                |                |                |                |                |
| 0                     | 2.2              | 2.1            | 2.8            | 4.0            | 5.3            | 7.3            | 6.2            | 5.4            | 4.9            |
| 2                     | 1.6              | 1.8            | 3.6            | 5.4            | 6.7            | 7.7            | 6.4            | 4.3            | 1.3            |
| 4                     | -0.2             | 1.5            | 3.9            | 5.2            | 5.7            | 4.1            | -0.3           | -2.2           | -3.6           |
| 6                     | 3.2              | 3.3            | 3.2            | 4.0            | 3.9            | 0.6            | -2.1           | -2.3           | -8.2           |
| 8                     | -0.4             | 0.7            | 2.6            | 2.4            | 2.1            | -0.2           | -5.2           | -4.9           | -7.5           |
| 10                    | 0.5              | 1.1            | 1.7            | 0.6            | -0.8           | -2.7           | -6.8           | -7.7           | -12.8          |
| 12                    | 0.8              | 0.3            | -0.7           | -1.0           | -2.5           | -4.5           | -3.7           | -4.8           | -3.5           |
| 14                    | -3.7             | -3.2           | -3.6           | -4.4           | -6.2           | -8.0           | -9.0           | -8.9           | -9.5           |
| 16                    | -0.9             | -1.0           | -2.9           | -3.9           | -6.0           | -6.3           | -4.2           | -1.6           | 3.6            |
| 18                    | 0.4              | -1.1           | -4.2           | -5.1           | -6.7           | -5.9           | -2.4           | 2.4            | 6.4            |
| 20                    | -0.7             | -2.6           | -3.8           | -4.7           | -4.1           | -0.9           | 4.6            | 6.1            | 4.7            |
| 22                    | -1.0             | -1.2           | -1.9           | -2.0           | -0.1           | 3.4            | 8.8            | 10.5           | 13.6           |
| 24                    | -1.3             | -0.8           | -0.1           | 0.8            | 4.0            | 7.6            | 11.1           | 10.4           | 9.3            |
| Amplitude             | 1.4              | 2.3            | 4.2            | 5.1            | 6.2            | 7.0            | 7.9            | 8.6            | 11.0           |
| 1st Harmonic<br>Phase | 5.8              | 5.5            | 4.5            | 3.8            | 2.7            | 0.8            | 24.4           | 23.1           | 21.7           |
| Amplitude             | 0.7              | 0.6            | 0.4            | 0.4            | 0.6            | 1.2            | 1.8            | 1.2            | 1.0            |
| 2nd Harmonic<br>Phase | 4.4              | 3.6            | 2.1            | 0.1            | 11.7           | 10.7           | 10.3           | 9.0            | 9.1            |

Guam

13°33'N., 144°50'E.

| Level (mb.)                        | 100            | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10             |
|------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record                   | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 |
| Months Missing                     | 0              | 3              | 4              | 2              | 4              | 4              | 15             | 32             |                |
|                                    | Annual Cycle   |                |                |                |                |                |                |                |                |
| January                            | -5.7           | -5.4           | -2.7           | -2.2           | -3.1           | -3.6           | -4.8           | -4.6           |                |
| February                           | -4.4           | -4.9           | -2.6           | -2.3           | -3.8           | -3.9           | -5.9           | -6.2           |                |
| March                              | -1.4           | -3.6           | -2.2           | -2.4           | -3.7           | -4.6           | -4.7           | -6.9           |                |
| April                              | -1.7           | -4.9           | -3.9           | -4.2           | -5.3           | -7.6           | -10.1          | -10.6          |                |
| May                                | -1.0           | -5.4           | -7.0           | -8.3           | -10.4          | -12.8          | -16.5          | -17.9          |                |
| June                               | -6.7           | -10.3          | -12.9          | -15.0          | -16.8          | -19.8          | -23.0          | -22.1          |                |
| July                               | -9.7           | -13.3          | -16.5          | -18.2          | -20.1          | -22.4          | -25.2          | -27.5          |                |
| August                             | -9.9           | -13.7          | -15.9          | -17.1          | -19.1          | -20.6          | -25.6          | -27.6          |                |
| September                          | -11.0          | -12.8          | -14.5          | -15.2          | -15.6          | -18.3          | -22.4          | -24.1          |                |
| October                            | -8.1           | -9.8           | -9.1           | -9.7           | -11.6          | -14.0          | -15.4          | -15.9          |                |
| November                           | -10.6          | -10.9          | -7.5           | -6.8           | -7.4           | -8.8           | -9.6           | -8.1           |                |
| December                           | -7.0           | -7.9           | -5.4           | -4.9           | -6.3           | -5.9           | -4.7           | -4.5           |                |
| Mean                               | -5.8           | -8.6           | -8.3           | -8.9           | -10.3          | -11.9          | -14.0          | -14.6          |                |
| Amplitude<br>1st Harmonic<br>Phase | 5.5            | 4.4            | 6.7            | 7.6            | 7.9            | 8.8            | 10.4           | 11.1           |                |
|                                    | 2.9            | 3.0            | 3.4            | 2.2            | 2.2            | 2.1            | 1.8            | 1.8            |                |
| Amplitude<br>2nd Harmonic<br>Phase | 1.4            | 0.7            | 1.1            | 1.1            | 1.2            | 0.9            | 1.2            | 1.8            |                |
|                                    | 1.3            | 4.6            | 4.7            | 4.7            | 4.6            | 4.5            | 5.2            | 5.5            |                |

| Level (mb.)                        | 100              | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10             |
|------------------------------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record                   | 1/51-<br>12/61   | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 |
| Months Missing                     | 0                | 3              | 4              | 2              | 4              | 4              | 15             | 32             |                |
|                                    | 26 - Month Cycle |                |                |                |                |                |                |                |                |
| Months                             |                  |                |                |                |                |                |                |                |                |
| 0                                  | 0.2              | 1.3            | 3.7            | 5.4            | 7.0            | 8.9            | 7.5            | 5.6            |                |
| 2                                  | 1.0              | 1.4            | 4.8            | 6.3            | 7.6            | 8.5            | 5.9            | 1.6            |                |
| 4                                  | -0.7             | 0.9            | 3.7            | 4.9            | 5.6            | 5.2            | 2.8            | -0.2           |                |
| 6                                  | 2.6              | 3.9            | 4.6            | 4.9            | 4.3            | 2.5            | -0.9           | -3.4           |                |
| 8                                  | -0.3             | 1.0            | 3.1            | 3.7            | 3.0            | 0.0            | -3.0           | -7.4           |                |
| 10                                 | 1.4              | 1.3            | 1.6            | 1.4            | -0.5           | -3.4           | -7.6           | -9.5           |                |
| 12                                 | 1.0              | 0.2            | -0.8           | -1.8           | -3.7           | -6.0           | -7.9           | -7.6           |                |
| 14                                 | 0.2              | 0.0            | -1.8           | -3.4           | -4.9           | -7.1           | -5.6           | -3.3           |                |
| 16                                 | -0.9             | -2.3           | -4.3           | -4.3           | -6.3           | -6.6           | -1.7           | 2.8            |                |
| 18                                 | -1.5             | -2.0           | -4.6           | -7.2           | -8.7           | -7.7           | -1.3           | 5.4            |                |
| 20                                 | -2.5             | -3.0           | -5.4           | -5.7           | -5.2           | -2.5           | 4.8            | 7.0            |                |
| 22                                 | 0.0              | -1.1           | -3.2           | -2.8           | -0.4           | 3.8            | 8.2            | 12.2           |                |
| 24                                 | -0.8             | -1.3           | -0.5           | 0.6            | 4.0            | 7.5            | 11.2           | 10.9           |                |
| Amplitude<br>1st Harmonic<br>Phase | 1.2              | 2.2            | 4.8            | 6.0            | 7.2            | 7.9            | 8.6            | 9.5            |                |
|                                    | 8.3              | 6.2            | 5.0            | 4.2            | 3.0            | 0.8            | 24.2           | 22.6           |                |
| Amplitude<br>2nd Harmonic<br>Phase | 0.5              | 0.4            | 0.9            | 1.0            | 1.0            | 1.4            | 1.0            | 0.7            |                |
|                                    | 3.1              | 2.9            | 1.9            | 1.2            | 12.8           | 11.0           | 9.3            | 6.0            |                |

Lima, Peru  
12°06'S., 77°02'W.

| Level (mb.)        | 100             | 80              | 60              | 50              | 40              | 30              | 20              | 15              | 10              |
|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Period of Record   | 10/57-<br>12/60 | 10/57-<br>12/60 | 10/57-<br>12/60 | 10/57-<br>12/60 | 10/57-<br>12/60 | 10/57-<br>12/60 | 10/57-<br>12/60 | 10/57-<br>12/60 | 10/57-<br>12/60 |
| Months Missing     | 0               | 0               | 0               | 0               | 0               | 1               | 3               |                 |                 |
|                    | Annual Cycle    |                 |                 |                 |                 |                 |                 |                 |                 |
| January            | -2.8            | -8.4            | -10.4           | -13.0           | -15.4           | -18.6           | -23.7           |                 |                 |
| February           | -6.2            | -7.8            | -10.8           | -13.0           | -17.7           | -21.5           | -27.3           |                 |                 |
| March              | -5.0            | -7.7            | -10.7           | -14.5           | -19.0           | -22.6           | -23.7           |                 |                 |
| April              | 3.8             | -1.2            | -6.1            | -10.2           | -14.0           | -18.6           | -18.5           |                 |                 |
| May                | 11.0            | 6.0             | -3.2            | -6.9            | -11.6           | -13.6           | -10.9           |                 |                 |
| June               | 8.5             | 5.6             | -1.1            | -4.8            | -7.4            | -6.5            | -3.1            |                 |                 |
| July               | 6.0             | 1.6             | -1.1            | -3.1            | -2.6            | -1.9            | 1.1             |                 |                 |
| August             | 6.3             | 1.6             | 0.1             | -1.1            | -2.2            | -1.1            | -1.2            |                 |                 |
| September          | 4.3             | 1.0             | -1.2            | -3.2            | -5.6            | -7.0            | -6.4            |                 |                 |
| October            | 1.3             | -2.6            | -3.8            | -6.6            | -8.3            | -11.6           | -12.0           |                 |                 |
| November           | 2.7             | -2.5            | -5.2            | -8.0            | -11.2           | -12.0           | -14.0           |                 |                 |
| December           | -0.1            | -5.6            | -9.3            | -10.9           | -12.9           | -15.1           | -22.0           |                 |                 |
| Mean               | 2.4             | -1.7            | -5.2            | -7.9            | -10.6           | -12.5           | -13.7           |                 |                 |
| Amplitude          | 5.5             | 5.8             | 5.1             | 5.5             | 6.9             | 8.8             | 11.8            |                 |                 |
| 1st Harmonic Phase | 7.6             | 7.4             | 8.0             | 8.3             | 8.6             | 8.5             | 8.1             |                 |                 |
| Amplitude          | 2.7             | 1.9             | 0.4             | 0.2             | 1.0             | 2.0             | 1.6             |                 |                 |
| 2nd Harmonic Phase | 5.8             | 5.7             | 5.4             | 7.2             | 7.3             | 7.2             | 6.9             |                 |                 |

| Level (mb.)        | 100              | 80              | 60              | 50              | 40              | 30              | 20              | 15              | 10              |
|--------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Period of Record   | 10/57-<br>12/60  | 10/57-<br>12/60 | 10/57-<br>12/60 | 10/57-<br>12/60 | 10/57-<br>12/60 | 10/57-<br>12/60 | 10/57-<br>12/60 | 10/57-<br>12/60 | 10/57-<br>12/60 |
| Months Missing     | 0                | 0               | 0               | 0               | 0               | 1               | 3               |                 |                 |
|                    | 26 - Month Cycle |                 |                 |                 |                 |                 |                 |                 |                 |
| Months             |                  |                 |                 |                 |                 |                 |                 |                 |                 |
| 0                  | -1.4             | 0.9             | 3.2             | 5.6             | 8.1             | 10.4            | 9.9             |                 |                 |
| 2                  | -1.6             | -0.7            | 3.7             | 5.3             | 6.3             | 7.3             | 3.2             |                 |                 |
| 4                  | -2.5             | -0.1            | 2.2             | 3.8             | 5.7             | 5.8             | 1.6             |                 |                 |
| 6                  | 0.7              | 2.5             | 6.2             | 5.7             | 4.0             | 0.0             | -6.3            |                 |                 |
| 8                  | 0.0              | 0.4             | 1.2             | -0.9            | -5.2            | -8.9            | -12.7           |                 |                 |
| 10                 | 1.3              | 1.2             | -0.6            | -5.4            | -8.0            | -16.0           | -16.6           |                 |                 |
| 12                 | 1.0              | -0.9            | -4.7            | -7.2            | -9.7            | -9.6            | -10.6           |                 |                 |
| 14                 | 3.4              | 0.8             | -2.8            | -3.8            | -8.3            | -11.7           | -8.0            |                 |                 |
| 16                 | 0.3              | -0.8            | -3.7            | -4.5            | -5.8            | -6.5            | -0.7            |                 |                 |
| 18                 | 1.2              | -0.8            | -2.9            | -4.0            | -5.1            | -5.1            | 0.7             |                 |                 |
| 20                 | 1.1              | -1.3            | -5.9            | -4.9            | -0.6            | 6.1             | 11.7            |                 |                 |
| 22                 | -0.8             | -1.0            | 1.0             | 5.3             | 10.1            | 13.5            | 16.6            |                 |                 |
| 24                 | -1.6             | 0.4             | 3.5             | 6.6             | 8.6             | 12.6            | 11.4            |                 |                 |
| Amplitude          | 2.1              | 2.7             | 4.9             | 6.5             | 9.1             | 12.2            | 12.9            |                 |                 |
| 1st Harmonic Phase | 10.8             | 7.0             | 3.8             | 1.8             | 0.1             | 24.9            | 23.5            |                 |                 |
| Amplitude          | 0.4              | 0.5             | 0.4             | 0.4             | 0.0             | 0.2             | 1.0             |                 |                 |
| 2nd Harmonic Phase | 1.9              | 2.9             | 2.6             | 2.2             | 12.7            | 10.0            | 4.8             |                 |                 |

Eniwetok Atoll

11°20'N., 162°20'E.

| Level (mb.)        | 100<br>1/51-<br>12/61 | 80<br>2/51-<br>12/61 | 60<br>2/51-<br>12/61 | 50<br>2/51-<br>12/61 | 40<br>2/51-<br>12/61 | 30<br>2/51-<br>12/61 | 20<br>2/51-<br>12/61 | 15<br>2/51-<br>12/61 | 10<br>4/51-<br>12/61 |
|--------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Period of Record   | 1/51-<br>12/61        | 2/51-<br>12/61       | 2/51-<br>12/61       | 2/51-<br>12/61       | 2/51-<br>12/61       | 2/51-<br>12/61       | 2/51-<br>12/61       | 2/51-<br>12/61       | 4/51-<br>12/61       |
| Months Missing     | 1                     | 7                    | 9                    | 6                    | 10                   | 12                   | 13                   | 17                   | 36                   |
|                    | Annual Cycle          |                      |                      |                      |                      |                      |                      |                      |                      |
| January            | -7.5                  | -8.1                 | -3.4                 | -2.9                 | -3.6                 | -3.1                 | -0.9                 | -0.6                 | -1.0                 |
| February           | -4.6                  | -5.6                 | -1.4                 | -1.3                 | -2.4                 | -2.6                 | -2.9                 | -4.4                 | -5.9                 |
| March              | -1.5                  | -2.9                 | -1.0                 | -0.8                 | -2.4                 | -3.1                 | -3.7                 | -4.2                 | -4.5                 |
| April              | 2.0                   | -1.4                 | -1.8                 | -3.2                 | -5.8                 | -7.6                 | -9.3                 | -10.3                | -13.9                |
| May                | 5.7                   | -0.3                 | -6.0                 | -8.7                 | -9.6                 | -12.7                | -14.7                | -15.6                | -17.0                |
| June               | -1.5                  | -7.3                 | -11.6                | -14.5                | -16.6                | -18.0                | -19.7                | -20.5                | -21.5                |
| July               | -2.4                  | -10.1                | -14.7                | -16.4                | -18.2                | -20.1                | -22.3                | -24.5                | -25.8                |
| August             | -4.8                  | -11.1                | -14.1                | -16.0                | -18.9                | -20.8                | -23.0                | -24.2                | -25.1                |
| September          | -5.7                  | -9.8                 | -11.6                | -13.9                | -14.6                | -15.9                | -17.0                | -18.4                | -22.2                |
| October            | -4.6                  | -7.0                 | -8.0                 | -9.6                 | -12.3                | -14.6                | -14.6                | -14.7                | -14.5                |
| November           | -7.0                  | -9.2                 | -6.8                 | -6.7                 | -9.0                 | -10.4                | -10.1                | -10.9                | -5.7                 |
| December           | -6.6                  | -9.7                 | -6.2                 | -9.4                 | -8.0                 | -8.6                 | -5.7                 | -2.0                 | -0.5                 |
| Mean               | -3.3                  | -6.9                 | -7.2                 | -8.7                 | -10.3                | -11.7                | -12.2                | -12.6                | -13.3                |
| Amplitude          | 4.2                   | 3.8                  | 6.0                  | 7.4                  | 7.6                  | 8.5                  | 9.8                  | 10.5                 | 11.7                 |
| 1st Harmonic Phase | 5.6                   | 4.2                  | 2.6                  | 2.6                  | 2.4                  | 2.3                  | 2.0                  | 1.7                  | 1.5                  |
| Amplitude          | 1.8                   | 2.0                  | 1.6                  | 1.7                  | 1.2                  | 1.1                  | 0.4                  | 0.7                  | 1.9                  |
| 2nd Harmonic Phase | 5.0                   | 4.6                  | 4.7                  | 3.8                  | 3.9                  | 3.4                  | 3.2                  | 5.9                  | 6.1                  |

| Level (mb.)        | 100<br>1/51-<br>12/61 | 80<br>2/51-<br>12/61 | 60<br>2/51-<br>12/61 | 50<br>2/51-<br>12/61 | 40<br>2/51-<br>12/61 | 30<br>2/51-<br>12/61 | 20<br>2/51-<br>12/61 | 15<br>2/51-<br>12/61 | 10<br>4/51-<br>12/61 |
|--------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Period of Record   | 1/51-<br>12/61        | 2/51-<br>12/61       | 2/51-<br>12/61       | 2/51-<br>12/61       | 2/51-<br>12/61       | 2/51-<br>12/61       | 2/51-<br>12/61       | 2/51-<br>12/61       | 4/51-<br>12/61       |
| Months Missing     | 1                     | 7                    | 9                    | 6                    | 10                   | 12                   | 13                   | 17                   | 36                   |
|                    | 26 - Month Cycle      |                      |                      |                      |                      |                      |                      |                      |                      |
| Months             |                       |                      |                      |                      |                      |                      |                      |                      |                      |
| 0                  | 0.0                   | 1.8                  | 4.3                  | 6.7                  | 8.3                  | 9.5                  | 8.8                  | 7.0                  | 1.0                  |
| 2                  | -2.6                  | 0.1                  | 5.6                  | 8.4                  | 9.9                  | 10.2                 | 7.0                  | 5.4                  | -3.0                 |
| 4                  | -1.8                  | 0.4                  | 4.9                  | 7.1                  | 8.0                  | 6.3                  | 1.8                  | -1.2                 | -10.8                |
| 6                  | 2.6                   | 4.1                  | 5.2                  | 5.8                  | 6.5                  | 4.0                  | -2.3                 | -3.2                 | -9.2                 |
| 8                  | 0.8                   | 1.8                  | 3.0                  | 3.1                  | 3.8                  | -0.8                 | -8.1                 | -10.4                | -15.3                |
| 10                 | 2.1                   | 2.1                  | 3.4                  | 2.0                  | -0.4                 | -5.0                 | -9.0                 | -10.0                | -12.7                |
| 12                 | 2.4                   | 1.2                  | -0.3                 | -1.5                 | -5.0                 | -8.6                 | -11.1                | -11.6                | -17.6                |
| 14                 | 1.7                   | 0.6                  | -2.0                 | -2.8                 | -6.6                 | -9.8                 | -10.7                | -9.0                 | -5.2                 |
| 16                 | 0.3                   | -1.3                 | -4.8                 | -7.2                 | -6.8                 | -8.6                 | -4.8                 | -3.2                 | 3.0                  |
| 18                 | -2.1                  | -3.4                 | -6.8                 | -9.4                 | -11.1                | -9.5                 | -2.9                 | 3.7                  | 7.1                  |
| 20                 | -2.8                  | -3.2                 | -6.3                 | -8.0                 | -7.6                 | -0.9                 | 8.4                  | 11.6                 | 14.0                 |
| 22                 | 0.1                   | -1.1                 | -3.4                 | -4.1                 | -3.2                 | 1.8                  | 10.1                 | 10.8                 | 14.3                 |
| 24                 | -1.8                  | -2.2                 | -1.1                 | 1.7                  | 5.2                  | 9.7                  | 12.2                 | 11.6                 | 8.6                  |
| Amplitude          | 1.3                   | 2.5                  | 6.0                  | 7.9                  | 9.4                  | 10.1                 | 11.3                 | 12.8                 | 14.6                 |
| 1st Harmonic Phase | 9.3                   | 6.6                  | 5.0                  | 4.1                  | 3.2                  | 1.2                  | 24.2                 | 22.7                 | 21.3                 |
| Amplitude          | 0.1                   | 0.3                  | 1.2                  | 1.9                  | 1.8                  | 1.1                  | 1.2                  | 1.9                  | 2.0                  |
| 2nd Harmonic Phase | 11.1                  | 0.2                  | 0.7                  | 0.3                  | 0.1                  | 12.1                 | 8.6                  | 7.7                  | 7.2                  |

**Balboa, Panama**  
8°58'N., 79°35'W.

| Level (mb.)                        | 100            | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10             |
|------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record                   | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 |
| Months Missing                     | 0              | 0              | 0              | 0              | 2              | 3              | 8              | 21             | 59             |
|                                    | Annual Cycle   |                |                |                |                |                |                |                |                |
| January                            | 0.2            | -4.0           | 0.9            | 0.5            | -0.9           | -2.1           | -2.8           | -2.8           | -6.2           |
| February                           | -1.3           | -4.2           | 1.1            | 1.5            | -1.0           | -2.1           | -3.1           | -4.9           | -6.0           |
| March                              | -1.5           | -5.1           | -0.1           | 0.3            | -0.4           | -2.8           | -4.2           | -3.7           | -8.6           |
| April                              | 0.4            | -2.7           | -0.9           | -1.9           | -4.1           | -7.6           | -11.4          | -11.8          | -11.5          |
| May                                | 2.2            | -1.0           | -4.0           | -7.4           | -10.4          | -12.5          | -15.1          | -15.6          | -14.6          |
| June                               | -0.7           | -6.0           | -9.3           | -11.7          | -14.1          | -16.7          | -19.0          | -17.7          | -25.8          |
| July                               | -6.7           | -11.5          | -14.0          | -15.1          | -16.2          | -17.9          | -18.9          | -23.4          | -23.2          |
| August                             | -8.6           | -11.9          | -12.9          | -14.8          | -16.8          | -18.7          | -19.9          | -19.5          | -20.0          |
| September                          | -4.5           | -7.8           | -8.7           | -10.4          | -13.2          | -15.3          | -15.8          | -13.6          | -15.9          |
| October                            | -0.3           | -3.1           | -5.0           | -7.0           | -9.4           | -11.0          | -12.0          | -11.2          | -11.2          |
| November                           | 0.9            | -1.0           | -1.8           | -4.2           | -7.0           | -8.8           | -7.6           | -6.0           | -5.4           |
| December                           | 0.6            | -4.4           | -1.1           | -2.3           | -3.8           | -5.2           | -6.6           | -8.6           | -8.0           |
| Mean                               | -1.6           | -5.3           | -4.7           | -6.0           | -8.1           | -10.1          | -11.6          | -11.8          | -13.3          |
| Amplitude<br>1st Harmonic<br>Phase | 2.6            | 3.0            | 6.6            | 7.4            | 7.6            | 7.9            | 8.2            | 8.3            | 8.3            |
|                                    | 2.3            | 2.3            | 2.1            | 2.2            | 2.1            | 2.0            | 1.8            | 1.7            | 1.5            |
| Amplitude<br>2nd Harmonic<br>Phase | 2.5            | 2.5            | 1.4            | 1.1            | 0.8            | 0.6            | 0.7            | 1.2            | 1.8            |
|                                    | 5.5            | 5.2            | 4.8            | 4.2            | 4.0            | 3.6            | 3.0            | 3.7            | 4.2            |

| Level (mb.)                        | 100              | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10             |
|------------------------------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record                   | 1/51-<br>12/61   | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 | 1/51-<br>12/61 |
| Months Missing                     | 0                | 0              | 0              | 0              | 2              | 3              | 8              | 21             | 59             |
|                                    | 26 - Month Cycle |                |                |                |                |                |                |                |                |
| Months                             |                  |                |                |                |                |                |                |                |                |
| 0                                  | 1.2              | 2.8            | 6.2            | 9.4            | 12.2           | 14.3           | 13.3           | 10.2           | 2.8            |
| 2                                  | -0.3             | 3.4            | 7.7            | 9.5            | 12.3           | 12.7           | 8.9            | 0.7            | -0.6           |
| 4                                  | -0.8             | 0.9            | 5.3            | 8.8            | 9.6            | 6.9            | -0.4           | -5.8           | -7.4           |
| 6                                  | 0                | 1.7            | 4.4            | 6.6            | 6.8            | 4.0            | -5.9           | -9.5           | -12.6          |
| 8                                  | -0.3             | 2.5            | 6.0            | 6.2            | 3.9            | -1.3           | -9.4           | -14.6          | -16.5          |
| 10                                 | 0.6              | 2.5            | 3.9            | 2.6            | -2.1           | -9.7           | -12.6          | -14.4          | -11.2          |
| 12                                 | 3.7              | 2.6            | 1.0            | -1.5           | -6.7           | -16.6          | -15.1          | -7.2           | -1.4           |
| 14                                 | 0.1              | -0.5           | -3.2           | -6.4           | -10.9          | -13.3          | -11.2          | -13.5          | -1.5           |
| 16                                 | -0.2             | -1.3           | -6.3           | -9.4           | -12.2          | -11.2          | -8.1           | -2.6           | 9.5            |
| 18                                 | 0.4              | -4.0           | -9.0           | -11.8          | -12.8          | -7.5           | 1.8            | 6.5            | 17.2           |
| 20                                 | -2.7             | -5.6           | -8.2           | -9.9           | -8.5           | 0.2            | 9.2            | 11.9           | 14.0           |
| 22                                 | -0.1             | -2.2           | -5.3           | -4.6           | 0.4            | 7.7            | 15.6           | 19.1           | 15.5           |
| 24                                 | -2.1             | -3.0           | -1.9           | 2.2            | 9.0            | 14.5           | 15.6           | 14.4           | 8.8            |
| Amplitude<br>1st Harmonic<br>Phase | 1.1              | 3.4            | 7.4            | 10.3           | 12.6           | 14.4           | 14.8           | 15.2           | 16.1           |
|                                    | 7.6              | 6.2            | 5.1            | 4.2            | 2.5            | 0.5            | 24.0           | 22.5           | 20.6           |
| Amplitude<br>2nd Harmonic<br>Phase | 0.8              | 1.3            | 1.8            | 2.2            | 2.0            | 1.4            | 2.0            | 2.0            | 0.9            |
|                                    | 0.7              | 0.7            | 12.8           | 12.5           | 11.4           | 9.6            | 9.5            | 8.8            | 9.7            |

Kwajalein Atoll  
8°43'N., 117°44'E.

| Level (mb.)           | 100            | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10             |
|-----------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record      | 1/51-<br>12/61 | 1/51-<br>12/61 | 2/51-<br>12/61 | 2/51-<br>12/61 | 2/51-<br>12/61 | 2/51-<br>12/61 | 2/51-<br>12/61 | 2/51-<br>12/61 | 2/51-<br>12/61 |
| Months Missing        | 7              | 10             | 13             | 17             | 20             | 25             | 51             |                |                |
|                       | Annual Cycle   |                |                |                |                |                |                |                |                |
| January               | -8.2           | -6.6           | -1.6           | -1.8           | -1.9           | 1.4            | 3.5            |                |                |
| February              | -5.7           | -7.4           | -1.1           | 1.2            | -1.1           | -1.3           | -2.3           |                |                |
| March                 | -2.7           | -3.6           | 0.8            | -0.3           | -0.9           | -0.8           | -3.2           |                |                |
| April                 | 4.5            | 0.6            | 0.5            | -1.9           | -4.2           | -7.1           | -7.8           |                |                |
| May                   | 6.2            | 0.9            | -4.4           | -6.6           | -9.1           | -11.9          | -14.4          |                |                |
| June                  | 0.9            | -5.4           | -8.8           | -10.8          | -11.8          | -14.9          | -15.9          |                |                |
| July                  | -2.3           | -8.8           | -10.7          | -11.5          | -15.2          | -17.6          | -23.4          |                |                |
| August                | -4.5           | -10.0          | -11.5          | -13.1          | -16.6          | -18.1          | -18.2          |                |                |
| September             | -4.9           | -7.3           | -8.8           | -10.9          | -14.6          | -16.4          | -15.6          |                |                |
| October               | -1.6           | -4.1           | -5.5           | -7.5           | -8.1           | -9.0           | -3.0           |                |                |
| November              | -5.0           | -7.6           | -5.3           | -5.5           | -7.1           | -10.4          | -5.7           |                |                |
| December              | -6.5           | -8.0           | -3.6           | -4.3           | -4.5           | -1.2           | 2.5            |                |                |
| Mean                  | -2.4           | -5.6           | -5.0           | -6.0           | -7.8           | -8.8           | -8.2           |                |                |
| Amplitude             | 4.3            | 2.6            | 5.0            | 6.2            | 7.0            | 8.7            | 10.7           |                |                |
| 1st Harmonic<br>Phase | 5.9            | 4.4            | 2.6            | 2.5            | 2.3            | 1.9            | 1.3            |                |                |
| Amplitude             | 2.8            | 2.4            | 1.3            | 0.9            | 0.7            | 0.4            | 1.2            |                |                |
| 2nd Harmonic<br>Phase | 5.0            | 4.9            | 4.4            | 3.7            | 4.6            | 1.1            | 5.5            |                |                |

| Level (mb.)           | 100              | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10             |
|-----------------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record      | 1/51-<br>12/61   | 1/51-<br>12/61 | 2/51-<br>12/61 | 2/51-<br>12/61 | 2/51-<br>12/61 | 2/51-<br>12/61 | 2/51-<br>12/61 | 2/51-<br>12/61 | 2/51-<br>12/61 |
| Months Missing        | 7                | 10             | 13             | 17             | 20             | 25             | 51             |                |                |
|                       | 26 - Month Cycle |                |                |                |                |                |                |                |                |
| Months                |                  |                |                |                |                |                |                |                |                |
| 0                     | -1.9             | 2.2            | 6.2            | 9.3            | 12.8           | 12.5           | 1.3            |                |                |
| 2                     | -0.5             | 0.5            | 5.8            | 9.7            | 11.3           | 12.7           | 9.5            |                |                |
| 4                     | -1.8             | 1.0            | 5.6            | 8.4            | 10.1           | 7.7            | 2.3            |                |                |
| 6                     | 3.1              | 4.7            | 6.1            | 7.7            | 8.1            | 4.6            | -2.1           |                |                |
| 8                     | 2.1              | 3.9            | 5.4            | 5.4            | 2.7            | -3.9           | -11.5          |                |                |
| 10                    | 1.2              | 3.4            | 5.5            | 3.3            | -1.8           | -11.9          | -13.9          |                |                |
| 12                    | 1.5              | 1.8            | 0.4            | -2.8           | -6.4           | -11.9          | -12.4          |                |                |
| 14                    | 1.8              | -0.1           | -3.4           | -6.0           | -10.9          | -11.2          | -6.2           |                |                |
| 16                    | 0.0              | -4.3           | -7.2           | -9.8           | -11.4          | -12.5          | -1.4           |                |                |
| 18                    | 0.7              | -3.7           | -9.4           | -13.9          | -12.6          | -4.4           | 7.5            |                |                |
| 20                    | -1.8             | -4.0           | -9.2           | -12.2          | -10.3          | 0.3            | 15.3           |                |                |
| 22                    | -0.8             | -5.2           | -6.1           | -6.2           | -0.8           | 9.0            | 15.8           |                |                |
| 24                    | -3.8             | -3.7           | -1.0           | 3.5            | 9.0            | 14.2           | 10.4           |                |                |
| Amplitude             | 1.2              | 3.6            | 8.0            | 10.5           | 12.4           | 13.0           | 12.7           |                |                |
| 1st Harmonic<br>Phase | 9.8              | 7.0            | 5.2            | 4.1            | 2.5            | 0.1            | 22.8           |                |                |
| Amplitude             | 0.6              | 0.4            | 1.5            | 2.5            | 2.3            | 0.8            | 2.3            |                |                |
| 2nd Harmonic<br>Phase | 5.1              | 1.0            | 12.7           | 12.4           | 12.0           | 11.0           | 6.1            |                |                |

Koror, Palau Islands  
7°21' N., 134°29' E.

| Level (mb.)                        | 100                 | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10             |
|------------------------------------|---------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record                   | 5/52-<br>12/61      | 5/52-<br>12/61 | 5/52-<br>12/61 | 5/52-<br>12/61 | 5/52-<br>12/61 | 5/52-<br>12/61 | 5/52-<br>12/61 | 5/52-<br>12/61 | 5/52-<br>12/61 |
| Months Missing                     | 10                  | 10             | 15             | 16             | 28             | 36             | 65             |                |                |
|                                    | <u>Annual Cycle</u> |                |                |                |                |                |                |                |                |
| January                            | -12.3               | -6.8           | -2.1           | -0.8           | 0.5            | 0.0            | -6.2           |                |                |
| February                           | -8.4                | -4.8           | -0.4           | -1.2           | -3.5           | -4.0           | -13.5          |                |                |
| March                              | -7.3                | -4.2           | -1.7           | -1.4           | -2.5           | -4.2           | 2.7            |                |                |
| April                              | -6.7                | -5.6           | -2.6           | -2.4           | -6.2           | -11.0          | -11.0          |                |                |
| May                                | -4.7                | -5.4           | -5.7           | -8.0           | -9.8           | -12.2          | -13.5          |                |                |
| June                               | -7.5                | -10.4          | -10.6          | -11.6          | -13.0          | -16.2          | -15.3          |                |                |
| July                               | -9.8                | -10.7          | -11.7          | -11.9          | -14.5          | -17.0          | -18.1          |                |                |
| August                             | -12.6               | -10.0          | -11.2          | -11.5          | -14.0          | -15.1          | -16.5          |                |                |
| September                          | -11.2               | -9.1           | -7.7           | -9.6           | -11.4          | -12.8          | -12.6          |                |                |
| October                            | -8.3                | -7.5           | -5.6           | -6.4           | -9.3           | -9.3           | -10.1          |                |                |
| November                           | -11.0               | -8.7           | -3.9           | -4.3           | -7.3           | -7.6           | -1.2           |                |                |
| December                           | -11.9               | -8.0           | -3.0           | -3.3           | -3.7           | -2.2           | -3.6           |                |                |
| Mean                               | -9.3                | -7.6           | -5.5           | -6.0           | -8.0           | -9.4           | -10.5          |                |                |
| Amplitude<br>1st Harmonic<br>Phase | 2.6                 | 2.5            | 4.8            | 5.5            | 6.3            | 7.3            | 6.8            |                |                |
| Amplitude<br>2nd Harmonic<br>Phase | 5.0                 | 4.0            | 2.1            | 2.0            | 1.8            | 1.4            | 0.9            |                |                |
| Amplitude<br>1st Harmonic<br>Phase | 1.5                 | 1.1            | 1.2            | 0.8            | 0.3            | 0.5            | 2.2            |                |                |
| Amplitude<br>2nd Harmonic<br>Phase | 4.6                 | 4.0            | 4.3            | 4.0            | 1.8            | 1.5            | 5.3            |                |                |

| Level (mb.)                        | 100                     | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10             |
|------------------------------------|-------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record                   | 5/52-<br>12/61          | 5/52-<br>12/61 | 5/52-<br>12/61 | 5/52-<br>12/61 | 5/52-<br>12/61 | 5/52-<br>12/61 | 5/52-<br>12/61 | 5/52-<br>12/61 | 5/52-<br>12/61 |
| Months Missing                     | 10                      | 10             | 15             | 16             | 28             | 36             | 65             |                |                |
|                                    | <u>26 - Month Cycle</u> |                |                |                |                |                |                |                |                |
| Months                             |                         |                |                |                |                |                |                |                |                |
| 0                                  | 0.4                     | 1.0            | 5.0            | 9.8            | 11.6           | 12.2           | 6.3            |                |                |
| 2                                  | 1.3                     | 2.6            | 6.6            | 9.6            | 12.8           | 13.5           | 6.0            |                |                |
| 4                                  | 0.9                     | 2.9            | 6.3            | 9.0            | 10.3           | 10.4           | -6.0           |                |                |
| 6                                  | 5.0                     | 3.4            | 5.2            | 7.2            | 8.0            | 3.1            | -2.9           |                |                |
| 8                                  | 1.2                     | 3.2            | 5.7            | 6.0            | 9.9            | 3.7            | -9.8           |                |                |
| 10                                 | 2.3                     | 3.6            | 4.6            | 3.6            | 0.0            | -9.7           | -16.7          |                |                |
| 12                                 | 1.1                     | 2.5            | 1.6            | -2.1           | -7.6           | -12.7          | -5.5           |                |                |
| 14                                 | -1.8                    | -2.0           | -2.3           | -5.7           | -9.5           | -12.0          | -6.3           |                |                |
| 16                                 | -1.0                    | -1.4           | -6.4           | -10.4          | -16.7          | -11.5          | 21.2           |                |                |
| 18                                 | -1.7                    | -3.4           | -6.6           | -12.5          | -12.8          | -8.9           | -2.8           |                |                |
| 20                                 | -5.2                    | -5.1           | -9.2           | -10.6          | -8.8           | 0.7            | 18.8           |                |                |
| 22                                 | -0.2                    | -3.1           | -7.3           | -6.2           | -1.3           | 6.0            | 11.9           |                |                |
| 24                                 | -1.5                    | -3.6           | -0.9           | 3.2            | 8.5            | 14.6           | 11.5           |                |                |
| Amplitude<br>1st Harmonic<br>Phase | 2.0                     | 3.8            | 7.8            | 10.5           | 13.3           | 13.1           | 11.8           |                |                |
| Amplitude<br>2nd Harmonic<br>Phase | 6.5                     | 6.4            | 5.4            | 3.2            | 2.9            | 0.7            | 22.8           |                |                |
| Amplitude<br>1st Harmonic<br>Phase | 0.2                     | 0.4            | 1.6            | 2.3            | 2.3            | 1.7            | 0.2            |                |                |
| Amplitude<br>2nd Harmonic<br>Phase | 1.2                     | 1.4            | 0.2            | 12.3           | 10.6           | 8.6            | 8.7            |                |                |



## Majuro Atoll

7°06'N., 171°24'E.

| Level (mb.)                        | 100             | 80              | 60              | 50              | 40              | 30              | 20              | 15              | 10              |
|------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Period of Record                   | 10/52-<br>12/60 | 10/52-<br>12/60 | 10/52-<br>12/60 | 10/52-<br>12/60 | 10/52-<br>12/60 | 10/52-<br>12/60 | 10/52-<br>12/60 | 10/52-<br>12/60 | 10/52-<br>12/60 |
| Months Missing                     | 26              | 28              | 29              | 29              | 30              | 33              | 44              |                 |                 |
|                                    | Annual Cycle    |                 |                 |                 |                 |                 |                 |                 |                 |
| January                            | -7.2            | -7.0            | -1.0            | -3.1            | -8.1            | -12.4           | -14.9           |                 |                 |
| February                           | -6.0            | -3.8            | 0.0             | -0.7            | -3.5            | -4.8            | -9.9            |                 |                 |
| March                              | -2.3            | -0.7            | 1.8             | 1.5             | -1.5            | -5.4            | -9.7            |                 |                 |
| April                              | 7.1             | 4.3             | 0.3             | -2.1            | -6.0            | -7.7            | -10.5           |                 |                 |
| May                                | 8.5             | 2.2             | -4.3            | -6.6            | -8.8            | -11.0           | -13.3           |                 |                 |
| June                               | 2.0             | -4.2            | -9.1            | -10.4           | -11.8           | -14.2           | -15.4           |                 |                 |
| July                               | -3.4            | -7.2            | -8.9            | -10.1           | -12.2           | -15.1           | -18.5           |                 |                 |
| August                             | -5.5            | -7.5            | -8.0            | -9.6            | -13.2           | -16.1           | -20.4           |                 |                 |
| September                          | -6.0            | -4.9            | -5.2            | -7.4            | -11.4           | -15.3           | -16.9           |                 |                 |
| October                            | 0.5             | -2.7            | -3.4            | -4.7            | -6.0            | -8.6            | -5.8            |                 |                 |
| November                           | -3.6            | -4.3            | -1.8            | -1.1            | -3.3            | -2.9            | -2.8            |                 |                 |
| December                           | -4.0            | -5.9            | -1.6            | -2.6            | -5.2            | -6.0            | -6.0            |                 |                 |
| Mean                               | -1.4            | -3.4            | -3.5            | -4.8            | -7.6            | -9.8            | -11.8           |                 |                 |
| Amplitude<br>1st Harmonic<br>Phase | 3.9             | 3.0             | 4.3             | 4.5             | 3.9             | 4.0             | 4.2             |                 |                 |
| Amplitude<br>2nd Harmonic<br>Phase | 5.7             | 4.5             | 2.1             | 1.9             | 2.0             | 2.0             | 1.0             |                 |                 |
| Amplitude                          | 4.0             | 3.0             | 1.5             | 1.6             | 1.8             | 2.4             | 3.9             |                 |                 |
| Phase                              | 5.2             | 4.7             | 4.1             | 4.2             | 4.5             | 4.8             | 5.1             |                 |                 |

| Level (mb.)                        | 100              | 80              | 60              | 50              | 40              | 30              | 20              | 15              | 10              |
|------------------------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Period of Record                   | 10/52-<br>12/60  | 10/52-<br>12/60 | 10/52-<br>12/60 | 10/52-<br>12/60 | 10/52-<br>12/60 | 10/52-<br>12/60 | 10/52-<br>12/60 | 10/52-<br>12/60 | 10/52-<br>12/60 |
| Months Missing                     | 26               | 28              | 29              | 29              | 30              | 33              | 44              |                 |                 |
|                                    | 26 - Month Cycle |                 |                 |                 |                 |                 |                 |                 |                 |
| Months                             |                  |                 |                 |                 |                 |                 |                 |                 |                 |
| 0                                  | 1.1              | 0.5             | 2.8             | 8.4             | 12.9            | 15.6            | 17.8            |                 |                 |
| 2                                  | 1.0              | 2.2             | 7.4             | 9.3             | 12.2            | 13.9            | 8.6             |                 |                 |
| 4                                  | -0.6             | 0.4             | 5.8             | 8.8             | 11.8            | 12.9            | 7.6             |                 |                 |
| 6                                  | 2.2              | 4.1             | 7.3             | 8.3             | 9.2             | 7.3             | 2.3             |                 |                 |
| 8                                  | -1.8             | 5.0             | 7.9             | 10.0            | 10.6            | 4.9             | 3.1             |                 |                 |
| 10                                 | 3.8              | 5.9             | 9.2             | 8.0             | 2.4             | -4.1            | -8.7            |                 |                 |
| 12                                 | 2.9              | 2.1             | 1.8             | -1.8            | -7.8            | -12.5           | -14.6           |                 |                 |
| 14                                 | 1.2              | 0.4             | -3.2            | -8.3            | -12.4           | -14.4           | -9.4            |                 |                 |
| 16                                 | 0.8              | -3.4            | -5.6            | -8.8            | -15.9           | -19.8           | -15.4           |                 |                 |
| 18                                 | -0.4             | -1.3            | -7.7            | -10.3           | -10.7           | -8.3            | -5.8            |                 |                 |
| 20                                 | -2.4             | -4.2            | -8.7            | -13.8           | -15.4           | -17.7           | 6.4             |                 |                 |
| 22                                 | -3.8             | -6.3            | -9.4            | -6.2            | -2.3            | 4.5             | 9.3             |                 |                 |
| 24                                 | -4.1             | -5.5            | -6.5            | -1.1            | 6.8             | 15.0            | 14.7            |                 |                 |
| Amplitude<br>1st Harmonic<br>Phase | 1.3              | 4.0             | 9.4             | 12.3            | 14.3            | 16.7            | 13.7            |                 |                 |
| Amplitude<br>2nd Harmonic<br>Phase | 12.1             | 7.6             | 6.4             | 4.2             | 3.5             | 2.0             | 25.7            |                 |                 |
| Amplitude                          | 0.8              | 0.2             | 1.0             | 1.8             | 2.8             | 3.3             | 2.5             |                 |                 |
| Phase                              | 12.0             | 1.2             | 0.3             | 12.0            | 10.8            | 10.7            | 9.5             |                 |                 |

Canton Island  
2°46'S., 171°43'W.

| Level (mb.)                        | 100<br>2/53-<br>12/61 | 80<br>2/53-<br>12/61 | 60<br>2/53-<br>12/61 | 50<br>2/53-<br>12/61 | 40<br>2/53-<br>12/61 | 30<br>2/53-<br>12/61 | 20<br>2/53-<br>12/61 | 15<br>2/53-<br>12/61 |
|------------------------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Period of Record                   | 2/53-<br>12/61        | 2/53-<br>12/61       | 2/53-<br>12/61       | 2/53-<br>12/61       | 2/53-<br>12/61       | 2/53-<br>12/61       | 2/53-<br>12/61       | 2/53-<br>12/61       |
| Months Missing                     | 3                     | 5                    | 6                    | 7                    | 8                    | 10                   | 27                   | 69                   |
|                                    | Annual Cycle          |                      |                      |                      |                      |                      |                      |                      |
| January                            | 1.8                   | 0.2                  | -1.9                 | -3.9                 | -5.5                 | -4.1                 | -7.4                 | -14.1                |
| February                           | 3.6                   | 0.7                  | -1.5                 | -4.7                 | -5.0                 | -3.4                 | -3.6                 | -8.3                 |
| March                              | 6.2                   | 2.1                  | -2.0                 | -3.2                 | -3.2                 | -4.5                 | -5.4                 | -6.6                 |
| April                              | 8.4                   | 5.1                  | 0.7                  | -1.2                 | -0.9                 | -4.7                 | -3.7                 | -7.1                 |
| May                                | 6.2                   | 5.2                  | 2.2                  | -0.4                 | -2.8                 | -5.4                 | -4.4                 | -5.2                 |
| June                               | 2.8                   | 3.7                  | 4.3                  | 1.4                  | -2.5                 | -3.6                 | -4.8                 | -9.1                 |
| July                               | -2.4                  | 0.0                  | 2.0                  | -0.3                 | -3.2                 | -3.4                 | -3.9                 | -13.8                |
| August                             | -3.5                  | -1.4                 | 0.6                  | -1.3                 | -4.2                 | -4.7                 | -1.8                 | -4.5                 |
| September                          | -3.6                  | -1.1                 | 0.6                  | -2.3                 | -6.2                 | -4.9                 | -4.4                 | -12.3                |
| October                            | 1.6                   | 1.6                  | 0.0                  | -3.1                 | -7.0                 | -7.4                 | -1.8                 | -15.6                |
| November                           | 5.2                   | 3.4                  | 1.1                  | -3.1                 | -5.8                 | -4.5                 | -4.7                 | -4.6                 |
| December                           | 4.7                   | 1.8                  | -1.3                 | -4.4                 | -5.9                 | -3.1                 | -4.0                 | -4.9                 |
| Mean                               | 2.7                   | 1.8                  | 0.4                  | -2.2                 | -4.3                 | -4.5                 | -3.9                 | -8.6                 |
| Amplitude<br>1st Harmonic<br>Phase | 3.6                   | 1.4                  | 2.0                  | 2.1                  | 2.1                  | 0.4                  | 1.2                  | 1.0                  |
|                                    | 3.1                   | 4.3                  | 7.1                  | 6.9                  | 5.4                  | 3.8                  | 8.3                  | 4.7                  |
| Amplitude<br>2nd Harmonic<br>Phase | 2.7                   | 2.0                  | 0.8                  | 0.6                  | 0.2                  | 0.8                  | 0.9                  | 1.5                  |
|                                    | 5.3                   | 5.4                  | 5.9                  | 6.2                  | 5.7                  | 1.4                  | 4.1                  | 5.2                  |

| Level (mb.)                        | 100<br>2/53-<br>12/61 | 80<br>2/53-<br>12/61 | 60<br>2/53-<br>12/61 | 50<br>2/53-<br>12/61 | 40<br>2/53-<br>12/61 | 30<br>2/53-<br>12/61 | 20<br>2/53-<br>12/61 | 15<br>2/53-<br>12/61 |
|------------------------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Period of Record                   | 2/53-<br>12/61        | 2/53-<br>12/61       | 2/53-<br>12/61       | 2/53-<br>12/61       | 2/53-<br>12/61       | 2/53-<br>12/61       | 2/53-<br>12/61       | 2/53-<br>12/61       |
| Months Missing                     | 3                     | 5                    | 6                    | 7                    | 8                    | 10                   | 27                   | 69                   |
|                                    | 26 - Month Cycle      |                      |                      |                      |                      |                      |                      |                      |
| Months                             |                       |                      |                      |                      |                      |                      |                      |                      |
| 0                                  | 0.8                   | -0.6                 | 4.7                  | 12.4                 | 18.8                 | 20.7                 | 11.2                 | 1.4                  |
| 2                                  | -0.9                  | 2.0                  | 7.3                  | 12.6                 | 17.2                 | 19.1                 | 15.4                 | 11.3                 |
| 4                                  | -1.0                  | 3.6                  | 14.2                 | 13.1                 | 14.9                 | 13.3                 | 12.7                 | 14.4                 |
| 6                                  | 1.4                   | 4.9                  | 8.6                  | 12.5                 | 12.8                 | 5.7                  | -3.0                 | -5.9                 |
| 8                                  | 1.2                   | 4.4                  | 8.6                  | 10.0                 | 7.0                  | -1.6                 | -9.8                 | -9.9                 |
| 10                                 | 3.3                   | 5.2                  | 7.7                  | 7.3                  | 0.1                  | -13.7                | -19.4                | -20.1                |
| 12                                 | 2.0                   | 4.1                  | 5.6                  | 0.5                  | -9.2                 | -18.7                | -15.8                | -9.7                 |
| 14                                 | 0.0                   | 2.0                  | -2.6                 | -9.9                 | -18.9                | -19.5                | -10.2                | -14.3                |
| 16                                 | -1.3                  | -4.3                 | -9.3                 | -14.9                | -18.4                | -17.6                | -11.1                | -1.3                 |
| 18                                 | -3.2                  | -4.8                 | -10.2                | -16.0                | -17.1                | -12.4                | -6.6                 | 8.2                  |
| 20                                 | -0.7                  | -5.1                 | -9.5                 | -10.6                | -16.5                | 3.1                  | 14.2                 | 17.2                 |
| 22                                 | -1.0                  | -4.2                 | -7.9                 | -7.8                 | -0.3                 | 12.7                 | 16.3                 | 16.7                 |
| 24                                 | -0.9                  | -5.4                 | -7.5                 | 1.5                  | 11.6                 | 17.9                 | 16.7                 | 17.0                 |
| Amplitude<br>1st Harmonic<br>Phase | 0.9                   | 5.0                  | 10.7                 | 14.7                 | 18.7                 | 20.3                 | 17.6                 | 17.8                 |
|                                    | 8.2                   | 7.6                  | 6.1                  | 4.5                  | 2.8                  | 0.5                  | 24.3                 | 22.5                 |
| Amplitude<br>2nd Harmonic<br>Phase | 0.8                   | 0.6                  | 1.4                  | 2.2                  | 2.4                  | 1.2                  | 1.6                  | 3.7                  |
|                                    | 11.5                  | 0.5                  | 0.6                  | 11.8                 | 11.5                 | 9.1                  | 6.2                  | 6.3                  |

Ascension Island  
7°55'S., 14°25'W.

| Level (mb.)                        | 100           | 80            | 60            | 50            | 40            | 30            | 20            | 15            | 10            |
|------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Period of Record                   | 9/57-<br>8/60 | 9/57-<br>8/60 | 9/57-<br>8/60 | 9/57-<br>8/60 | 9/57-<br>8/60 | 9/57-<br>8/60 | 9/57-<br>8/60 | 9/57-<br>8/60 | 9/57-<br>8/60 |
| Months Missing                     | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             |
|                                    | Annual Cycle  |               |               |               |               |               |               |               |               |
| January                            | 2.3           | -4.3          | -6.4          | -8.8          | -13.8         | -19.7         | -21.4         | -19.4         | -23.0         |
| February                           | -4.3          | -5.2          | -7.4          | -10.6         | -16.0         | -22.2         | -22.9         | -21.4         | -26.2         |
| March                              | -3.1          | -4.6          | -6.6          | -10.8         | -16.2         | -21.2         | -18.9         | -18.4         | -24.0         |
| April                              | -0.1          | -2.6          | -5.0          | -9.1          | -14.2         | -18.2         | -15.2         | -13.4         | -15.9         |
| May                                | 2.6           | -1.8          | -5.3          | -8.0          | -12.5         | -13.6         | -8.8          | -7.0          | -5.2          |
| June                               | 1.4           | -3.4          | -5.2          | -7.9          | -9.6          | -8.8          | -6.0          | -4.2          | -4.3          |
| July                               | -2.5          | -3.4          | -4.3          | -4.2          | -6.1          | -8.6          | -7.6          | -7.3          | -15.5         |
| August                             | -1.5          | -4.4          | -2.5          | -3.0          | -6.1          | -8.0          | -8.1          | -8.3          | -16.7         |
| September                          | 2.4           | 0.2           | 2.1           | 0.0           | -6.1          | -9.1          | -11.0         | -13.8         | -18.4         |
| October                            | 5.3           | 1.0           | 0.6           | -3.0          | -8.4          | -11.5         | -13.2         | -14.8         | -14.0         |
| November                           | 0.9           | -4.0          | -3.4          | -5.6          | -9.2          | -11.7         | -16.0         | -16.1         | -12.4         |
| December                           | 2.9           | -6.1          | -6.0          | -7.8          | -11.9         | -16.4         | -19.8         | -16.7         | -16.2         |
| Mean                               | 0.6           | -3.3          | -4.2          | -6.7          | -10.9         | -14.1         | -14.1         | -13.3         | -15.8         |
| Amplitude<br>1st Harmonic<br>Phase | 2.5           | 1.2           | 3.0           | 4.1           | 4.7           | 6.5           | 7.1           | 6.4           | 5.1           |
|                                    | 10.7          | 8.5           | 9.5           | 9.3           | 9.0           | 8.6           | 7.7           | 7.4           | 7.7           |
| Amplitude<br>2nd Harmonic<br>Phase | 2.1           | 1.2           | 1.4           | 0.6           | 0.5           | 1.2           | 1.2           | 2.2           | 5.6           |
|                                    | 5.7           | 4.3           | 4.1           | 3.6           | 1.2           | 6.2           | 5.9           | 6.2           | 5.8           |

| Level (mb.)                        | 100              | 80            | 60            | 50            | 40            | 30            | 20            | 15            | 10            |
|------------------------------------|------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Period of Record                   | 9/57-<br>8/60    | 9/57-<br>8/60 | 9/57-<br>8/60 | 9/57-<br>8/60 | 9/57-<br>8/60 | 9/57-<br>8/60 | 9/57-<br>8/60 | 9/57-<br>8/60 | 9/57-<br>8/60 |
| Months Missing                     | 0                | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             |
|                                    | 26 - Month Cycle |               |               |               |               |               |               |               |               |
| Months                             |                  |               |               |               |               |               |               |               |               |
| 0                                  | -2.0             | 0.4           | 2.3           | 6.6           | 12.5          | 15.6          | 14.8          | 9.0           | 1.1           |
| 2                                  | 0.0              | 1.3           | 4.9           | 8.2           | 13.1          | 16.2          | 13.0          | 5.0           | -4.6          |
| 4                                  | 1.0              | 0.1           | 3.7           | 7.4           | 11.3          | 12.6          | 5.2           | -1.9          | -7.5          |
| 6                                  | -1.2             | 1.6           | 6.1           | 8.2           | 9.2           | 5.2           | -4.6          | -9.7          | -12.1         |
| 8                                  | 3.9              | 3.7           | 6.6           | 5.3           | -0.1          | -7.2          | -14.1         | -13.7         | -23.0         |
| 10                                 | 5.4              | 5.8           | 9.9           | 6.4           | -5.6          | -13.1         | -15.6         | -16.7         | -11.8         |
| 12                                 | 3.1              | 2.0           | 3.8           | -4.7          | -12.7         | -16.3         | -15.0         | -12.7         | -9.8          |
| 14                                 | -0.6             | -1.2          | -4.5          | -8.6          | -13.5         | -17.4         | -16.3         | -8.3          | 5.1           |
| 16                                 | 0.6              | -1.4          | -6.0          | -9.2          | -12.2         | -13.8         | -9.0          | 0.3           | 7.4           |
| 18                                 | 0.1              | 0.2           | -2.6          | -6.2          | -10.6         | -11.9         | -0.8          | 5.9           | 9.1           |
| 20                                 | -2.8             | -2.9          | -7.8          | -9.8          | -7.5          | 2.6           | 12.2          | 14.7          | 17.7          |
| 22                                 | -2.7             | -5.1          | -7.6          | -2.7          | 7.5           | 13.3          | 14.8          | 12.6          | 11.8          |
| 24                                 | -4.3             | -3.1          | 0.1           | 4.3           | 12.0          | 15.3          | 14.9          | 14.3          | 11.2          |
| Amplitude<br>1st Harmonic<br>Phase | 3.8              | 3.3           | 6.6           | 9.5           | 14.7          | 18.4          | 17.4          | 15.5          | 15.9          |
|                                    | 10.5             | 8.7           | 5.8           | 3.7           | 1.5           | 0.1           | 24.3          | 22.5          | 20.4          |
| Amplitude<br>2nd Harmonic<br>Phase | 0.4              | 0.4           | 0.6           | 0.9           | 0.7           | 0.7           | 0.5           | 1.0           | 1.8           |
|                                    | 12.7             | 11.2          | 10.6          | 10.8          | 10.3          | 9.1           | 6.9           | 5.6           | 3.0           |

Recife, Brazil

8°01'S., 34°51'W.

| Level (mb.)      | 100            | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10 |
|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
| Period of Record | 7/52-<br>12/60 | 8/55-<br>12/60 | 8/55-<br>12/60 | 8/55-<br>12/60 | 8/55-<br>12/60 | 8/55-<br>12/60 | 8/55-<br>12/60 | 9/55-<br>12/60 |    |
| Months Missing   | 45             | 50             | 51             | 52             | 54             | 59             | 63             |                |    |
|                  | Annual Cycle   |                |                |                |                |                |                |                |    |
| January          | 2.2            | -3.6           | -9.3           | -11.8          | -14.8          | -18.5          | -17.5          |                |    |
| February         | -0.3           | -6.7           | -10.3          | -12.7          | -12.8          | -18.3          | -21.4          |                |    |
| March            | -0.4           | -4.2           | -6.8           | -9.8           | -13.4          | -9.9           | -11.8          |                |    |
| April            | 1.2            | -2.7           | -5.2           | -7.8           | -11.3          | -11.0          | -11.8          |                |    |
| May              | 5.5            | -1.0           | -3.3           | -5.4           | -8.2           | -10.4          | -3.6           |                |    |
| June             | 4.8            | -0.2           | -4.0           | -5.7           | -7.5           | -7.1           | -3.7           |                |    |
| July             | 2.8            | -0.4           | 0.2            | 0.0            | -4.1           | -8.2           | -6.4           |                |    |
| August           | -0.5           | -2.0           | -0.5           | -0.9           | -4.7           | -7.6           | -10.1          |                |    |
| September        | -0.3           | -0.9           | -1.3           | -0.9           | -4.6           | -6.7           | -9.3           |                |    |
| October          | 2.0            | -1.8           | -2.8           | -6.5           | -8.4           | -9.4           | -7.0           |                |    |
| November         | 3.6            | -2.9           | -4.3           | -7.7           | -11.3          | -13.0          | -8.6           |                |    |
| December         | 0.6            | -5.3           | -7.9           | -10.1          | -13.1          | -15.1          | -10.3          |                |    |
| Mean             | 1.6            | -2.8           | -4.8           | -6.8           | -9.6           | -11.3          | -10.3          |                |    |
| Amplitude        | 0.9            | 2.0            | 4.1            | 5.2            | 4.7            | 4.8            | 5.2            |                |    |
| 1st Harmonic     | 6.0            | 7.9            | 8.3            | 8.2            | 8.0            | 8.0            | 8.4            |                |    |
| Amplitude        | 1.7            | 0.5            | 0.5            | 0.4            | 0.6            | 1.3            | 3.8            |                |    |
| 2nd Harmonic     | 6.1            | 6.0            | 4.5            | 3.0            | 3.1            | 4.5            | 5.7            |                |    |

| Level (mb.)      | 100              | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10 |
|------------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
| Period of Record | 7/52-<br>12/60   | 8/55-<br>12/60 | 8/55-<br>12/60 | 8/55-<br>12/60 | 8/55-<br>12/60 | 8/55-<br>12/60 | 8/55-<br>12/60 | 9/55-<br>12/60 |    |
| Months Missing   | 45               | 50             | 51             | 52             | 54             | 59             | 63             |                |    |
|                  | 26 - Month Cycle |                |                |                |                |                |                |                |    |
| Months           | 0                | 0.3            | 0.8            | -3.7           | -8.7           | -13.2          | -19.0          | -13.1          |    |
| 2                | -3.1             | -8.1           | -11.0          | -13.2          | -13.4          | -3.8           | 10.8           |                |    |
| 4                | -1.1             | -1.8           | -4.8           | -7.5           | -7.8           | 1.1            | 6.9            |                |    |
| 6                | -0.2             | -3.2           | -6.0           | -1.3           | 8.1            | 17.4           | 14.1           |                |    |
| 8                | 1.0              | -0.2           | 2.3            | 4.9            | 11.0           | 12.5           | 11.4           |                |    |
| 10               | 1.0              | 1.6            | 4.1            | 7.1            | 11.7           | 14.8           | 9.6            |                |    |
| 12               | 1.0              | 2.1            | 6.2            | 10.2           | 14.0           | 15.1           | 9.2            |                |    |
| 14               | 2.5              | 1.8            | 5.7            | 8.7            | 10.9           | 5.9            | -1.6           |                |    |
| 16               | -4.1             | 4.7            | 5.4            | 4.3            | 0.3            | -7.3           | -11.5          |                |    |
| 18               | -1.8             | 0.0            | 0.3            | -0.7           | -11.7          | -12.2          | -8.0           |                |    |
| 20               | 2.6              | 0.7            | 3.6            | -2.6           | -6.0           | -13.9          | -14.2          |                |    |
| 22               | 0.8              | 1.0            | -6.3           | -10.9          | -14.0          | -16.0          | -7.2           |                |    |
| 24               | -3.9             | -0.2           | -7.3           | -6.7           | -10.8          | -12.9          | 1.0            |                |    |
| Amplitude        | 1.8              | 2.7            | 6.6            | 10.0           | 13.8           | 17.3           | 12.1           |                |    |
| 1st Harmonic     | 10.2             | 8.4            | 5.9            | 4.5            | 3.0            | 1.5            | 25.0           |                |    |
| Amplitude        | 1.4              | 1.0            | 1.0            | 1.6            | 2.1            | 2.6            | 2.6            |                |    |
| 2nd Harmonic     | 9.1              | 10.3           | 10.7           | 10.7           | 9.5            | 9.3            | 8.7            |                |    |

Antofagasta, Chile  
23°26' S., 70°28' W.

| Level (mb.)                        | 100            | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10             |
|------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record                   | 7/57-<br>12/60 | 7/57-<br>12/60 | 7/57-<br>12/60 | 7/57-<br>12/60 | 7/57-<br>12/60 | 7/57-<br>12/60 | 7/57-<br>12/60 | 7/57-<br>12/60 | 7/57-<br>12/60 |
| Months Missing                     | 0              | 0              | 0              | 0              | 1              | 0              | 4              |                |                |
|                                    | Annual Cycle   |                |                |                |                |                |                |                |                |
| January                            | 2.4            | -3.6           | -9.2           | -12.8          | -15.4          | -17.5          | -20.5          |                |                |
| February                           | 0.0            | -5.6           | -11.2          | -14.5          | -17.0          | -20.7          | -25.6          |                |                |
| March                              | 5.2            | -1.3           | -8.3           | -11.9          | -14.9          | -17.9          | -20.4          |                |                |
| April                              | 15.0           | 6.1            | -1.3           | -4.8           | -8.2           | -10.6          | -13.1          |                |                |
| May                                | 15.8           | 9.7            | 3.4            | 0.3            | -1.3           | -2.7           | -1.8           |                |                |
| June                               | 16.8           | 9.7            | 7.3            | 6.3            | -6.3           | 7.0            | 10.0           |                |                |
| July                               | 15.6           | 11.1           | 6.1            | 6.7            | -7.3           | 9.5            | 12.9           |                |                |
| August                             | 15.6           | 11.0           | 6.2            | 4.2            | 3.6            | 3.0            | 8.8            |                |                |
| September                          | 13.3           | 7.9            | 2.6            | 0.8            | -0.5           | -1.0           | 4.7            |                |                |
| October                            | 10.3           | 2.5            | -2.4           | -4.1           | -5.1           | -4.2           | -1.2           |                |                |
| November                           | 9.4            | 2.5            | -3.6           | -5.7           | -7.5           | -8.3           | -6.7           |                |                |
| December                           | 4.9            | -0.4           | -5.9           | -8.7           | -10.9          | -12.7          | -12.2          |                |                |
| Mean                               | 10.4           | 4.1            | -1.3           | -3.7           | -7.5           | -6.3           | -5.5           |                |                |
| Amplitude<br>1st Harmonic<br>Phase | 6.7            | 7.1            | 7.9            | 9.2            | 7.1            | 12.2           | 16.5           |                |                |
|                                    | 7.6            | 7.7            | 7.8            | 7.9            | 8.4            | 8.0            | 8.3            |                |                |
| Amplitude<br>2nd Harmonic<br>Phase | 2.0            | 1.3            | 1.5            | 1.8            | 1.7            | 2.7            | 3.1            |                |                |
|                                    | 5.4            | 5.8            | 6.2            | 6.3            | 4.8            | 6.5            | 6.4            |                |                |

| Level (mb.)                        | 100              | 80             | 60             | 50             | 40             | 30             | 20             | 15             | 10             |
|------------------------------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record                   | 7/57-<br>12/60   | 7/57-<br>12/60 | 7/57-<br>12/60 | 7/57-<br>12/60 | 7/57-<br>12/60 | 7/57-<br>12/60 | 7/57-<br>12/60 | 7/57-<br>12/60 | 7/57-<br>12/60 |
| Months Missing                     | 0                | 0              | 0              | 0              | 1              | 0              | 4              |                |                |
|                                    | 26 - Month Cycle |                |                |                |                |                |                |                |                |
| Months                             |                  |                |                |                |                |                |                |                |                |
| 0                                  | -2.0             | -0.9           | -0.6           | 2.8            | 5.2            | 5.2            | 6.6            |                |                |
| 2                                  | -1.2             | -0.8           | -0.9           | -0.5           | -0.5           | -0.6           | -0.5           |                |                |
| 4                                  | 0.1              | 0.2            | 0.0            | 0.1            | 0.9            | 0.2            | 0.4            |                |                |
| 6                                  | -2.2             | -2.0           | -2.5           | -1.0           | -1.4           | -0.6           | -1.1           |                |                |
| 8                                  | 1.4              | -0.4           | -0.4           | 0.1            | 0.7            | -0.1           | 0.4            |                |                |
| 10                                 | 2.7              | 2.0            | 1.3            | -1.0           | 0.2            | -1.0           | -4.5           |                |                |
| 12                                 | 2.4              | 0.8            | 0.2            | -1.4           | -2.7           | -4.5           | -8.1           |                |                |
| 14                                 | -2.3             | -1.4           | -0.2           | -1.0           | -1.8           | -2.9           | -4.2           |                |                |
| 16                                 | 0.5              | 1.1            | -0.4           | -1.4           | -1.5           | -1.1           | -0.6           |                |                |
| 18                                 | 2.4              | 1.1            | 1.1            | 0.3            | -0.2           | 0.3            | 0.4            |                |                |
| 20                                 | -0.6             | 0.6            | 0.9            | 0.5            | 0.8            | 1.5            | 1.3            |                |                |
| 22                                 | -0.3             | 1.1            | 1.8            | 1.8            | 1.0            | 1.5            | 1.6            |                |                |
| 24                                 | -1.1             | -1.8           | -1.0           | -0.5           | 1.2            | 3.0            | 7.8            |                |                |
| Amplitude<br>1st Harmonic<br>Phase | 1.3              | 0.4            | 0.7            | 1.5            | 2.4            | 3.8            | 4.3            |                |                |
|                                    | 10.9             | 12.7           | 10.8           | 23.4           | 23.8           | 23.3           | 23.8           |                |                |
| Amplitude<br>2nd Harmonic<br>Phase | 0.5              | 0.4            | 0.4            | 0.5            | 1.0            | 1.7            | 1.9            |                |                |
|                                    | 6.3              | 6.4            | 8.4            | 10.0           | 10.2           | 9.8            | 10.1           |                |                |

## APPENDIX B

### Temperature Statistics for Individual Stations

Data for the annual cycle are based on nighttime observations only. Data for the 26-month cycle are based on both 0000 GCT and 1200 GCT observations, treated separately. Period of record is given at the top of the table. Continuous records exist at all stations except Lihue, Hawaiian Islands where some months are missing, especially at 20 mb. Values are in degrees Celsius. Phases of the annual cycle give times of occurrence of maximum temperature to the nearest tenth of a month. (For instance, 4.3 indicates three-tenths of the way through the fourth month, or April 9.) Phases of the 26-month cycle give times of occurrence of maximum temperature to the nearest tenth of a month on the 26-month calendar (see Introduction). Whole numbers refer to middle of months; thus, 0.0 corresponds to July 15, 1957.

Lihue, Kauai, Hawaiian Islands  
21°59'N., 159°21'W.

| Level (mb.)                        | 100            | 80             | 50             | 30             | 20             | 15             | 10             |
|------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record                   | 1/51<br>-12/60 | 1/51<br>-12/60 | 1/51<br>-12/60 | 4/51<br>-12/60 | 4/51<br>-12/60 | 4/51<br>-12/60 | 4/51<br>-12/60 |
| January                            | -76.2          | -77.2          | -65.5          | -57.5          | -53.7          |                |                |
| February                           | -74.5          | -75.8          | -65.5          | -58.6          | -53.2          |                |                |
| March                              | -72.4          | -72.6          | -64.0          | -55.9          | -50.7          |                |                |
| April                              | -72.4          | -71.8          | -62.4          | -53.4          | -48.4          |                |                |
| May                                | -71.0          | -69.4          | -60.3          | -51.4          | -46.4          |                |                |
| June                               | -70.1          | -68.3          | -59.6          | -51.7          | -47.6          |                |                |
| July                               | -69.8          | -67.4          | -59.4          | -51.8          | -47.1          |                |                |
| August                             | -70.0          | -67.3          | -59.6          | -52.6          | -48.1          |                |                |
| September                          | -71.4          | -68.8          | -60.5          | -52.9          | -48.3          |                |                |
| October                            | -73.0          | -71.0          | -61.8          | -54.9          | -50.2          |                |                |
| November                           | -74.9          | -73.8          | -63.4          | -55.5          | -50.2          |                |                |
| December                           | -75.3          | -75.4          | -64.5          | -56.0          | -50.2          |                |                |
| Mean                               | -72.6          | -71.7          | -62.2          | -54.3          | -49.7          |                |                |
| Amplitude<br>1st Harmonic<br>Phase | 2.8            | 4.3            | 2.9            | 2.7            | 2.8            |                |                |
| Amplitude<br>2nd Harmonic<br>Phase | 7.2            | 7.6            | 7.7            | 7.6            | 7.3            |                |                |
| Amplitude<br>1st Harmonic<br>Phase | 0.3            | 0.5            | 0.3            | 0.8            | 0.8            |                |                |
| Amplitude<br>2nd Harmonic<br>Phase | 3.5            | 4.1            | 5.5            | 5.6            | 5.1            |                |                |

| Level (mb.)                        | 100              | 80             | 50             | 30             | 20             | 15             | 10             |
|------------------------------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record                   | 1/51<br>-12/60   | 1/51<br>-12/60 | 1/51<br>-12/60 | 4/51<br>-12/60 | 4/51<br>-12/60 | 4/51<br>-12/60 | 4/51<br>-12/60 |
| Months                             | 26 - Month Cycle |                |                |                |                |                |                |
| 0                                  | 0.2              | -0.1           | -0.1           | 0.4            | 1.0            |                |                |
| 2                                  | -0.7             | -0.4           | 0.0            | 0.7            | 1.1            |                |                |
| 4                                  | -1.3             | -0.5           | 0.1            | 0.8            | 1.1            |                |                |
| 6                                  | -0.3             | -0.4           | -0.1           | 0.7            | 1.0            |                |                |
| 8                                  | 0.2              | -0.2           | 0.1            | 0.6            | 1.0            |                |                |
| 10                                 | -0.5             | -0.1           | 0.1            | 0.3            | 0.8            |                |                |
| 12                                 | 0.5              | 0.3            | 0.2            | -0.2           | -0.1           |                |                |
| 14                                 | 0.7              | 0.4            | 0.2            | -0.4           | -0.9           |                |                |
| 16                                 | 1.3              | 0.5            | 0.4            | -0.3           | -1.4           |                |                |
| 18                                 | 0.8              | 0.6            | 0.5            | -0.4           | -1.5           |                |                |
| 20                                 | -0.3             | 0.1            | -0.3           | -1.2           | -1.7           |                |                |
| 22                                 | 0.4              | 0.1            | -0.9           | -1.4           | -0.9           |                |                |
| 24                                 | 0.0              | -0.1           | -0.8           | -0.4           | 0.0            |                |                |
| Amplitude<br>1st Harmonic<br>Phase | 0.4              | 0.5            | 0.3            | 0.8            | 1.4            |                |                |
| Amplitude<br>2nd Harmonic<br>Phase | 16.3             | 16.9           | 11.6           | 5.9            | 4.9            |                |                |
| Amplitude<br>1st Harmonic<br>Phase | 0.3              | 0.1            | 0.3            | 0.3            | 0.3            |                |                |
| Amplitude<br>2nd Harmonic<br>Phase | 1.7              | 0.8            | 3.2            | 2.7            | 12.1           |                |                |

Wake Island  
19°17' N., 166°39' E.

| Level (mb.)                        | 100            | 80             | 50             | 30             | 20             | 15 | 10 |
|------------------------------------|----------------|----------------|----------------|----------------|----------------|----|----|
| Period of Record                   | 5/52<br>-12/60 | 5/52<br>-12/60 | 5/52<br>-12/60 | 7/59<br>-12/60 | 9/56<br>-12/60 |    |    |
|                                    | Annual Cycle   |                |                |                |                |    |    |
| January                            | -81.2          | -82.1          | -66.4          | -57.5          | -53.6          |    |    |
| February                           | -80.7          | -81.9          | -66.9          | -58.0          | -54.1          |    |    |
| March                              | -79.5          | -80.0          | -65.4          | -56.6          | -51.3          |    |    |
| April                              | -77.2          | -77.5          | -63.8          | -55.2          | -50.0          |    |    |
| May                                | -75.6          | -74.2          | -62.4          | -54.4          | -49.5          |    |    |
| June                               | -75.5          | -72.5          | -61.5          | -53.8          | -48.9          |    |    |
| July                               | -70.8          | -68.4          | -60.5          | -53.9          | -49.0          |    |    |
| August                             | -71.3          | -68.3          | -60.5          | -53.8          | -49.1          |    |    |
| September                          | -73.8          | -70.6          | -61.2          | -54.1          | -49.1          |    |    |
| October                            | -76.9          | -74.3          | -62.4          | -55.1          | -49.7          |    |    |
| November                           | -79.5          | -79.7          | -64.2          | -55.5          | -50.3          |    |    |
| December                           | -80.2          | -81.5          | -65.5          | -56.2          | -51.3          |    |    |
| Mean                               | -76.8          | -75.9          | -63.4          | -55.3          | -50.5          |    |    |
| Amplitude<br>1st Harmonic<br>Phase | 4.0<br>7.7     | 6.4<br>7.9     | 2.8<br>8.2     | 1.5<br>8.1     | 1.4<br>9.4     |    |    |
| Amplitude<br>2nd Harmonic<br>Phase | 0.6<br>3.0     | 0.8<br>2.9     | 0.1<br>5.2     | 0.5<br>5.3     | 0.8<br>5.0     |    |    |

| Level (mb.)                        | 100              | 80             | 50             | 30             | 20             | 15 | 10 |
|------------------------------------|------------------|----------------|----------------|----------------|----------------|----|----|
| Period of Record                   | 5/52<br>-12/60   | 5/52<br>-12/60 | 5/52<br>-12/60 | 7/59<br>-12/60 | 9/56<br>-12/60 |    |    |
|                                    | 26 - Month Cycle |                |                |                |                |    |    |
| Months                             |                  |                |                |                |                |    |    |
| 0                                  | -0.2             | 0.0            | 0.3            | 0.6            | -0.2           |    |    |
| 2                                  | -0.4             | -0.2           | 0.3            | 1.0            | -0.1           |    |    |
| 4                                  | 0.0              | -1.1           | -1.1           | -0.6           | 0.5            |    |    |
| 6                                  | 0.5              | 0.7            | 0.4            | 0.9            | 0.9            |    |    |
| 8                                  | 0.0              | -0.3           | -0.4           | 0.7            | 1.6            |    |    |
| 10                                 | 0.4              | 0.0            | -0.4           | -0.1           | 0.8            |    |    |
| 12                                 | 0.7              | 0.6            | 0.6            | 0.8            | 1.3            |    |    |
| 14                                 | -0.1             | 0.2            | 0.2            | 0.2            | 0.1            |    |    |
| 16                                 | 0.5              | 0.6            | 0.2            | -0.2           | -1.0           |    |    |
| 18                                 | -0.1             | 0.1            | 0.8            | -0.2           | -0.8           |    |    |
| 20                                 | -0.1             | 0.8            | 0.5            | -1.3           | -1.7           |    |    |
| 22                                 | -0.4             | -0.9           | -0.9           | -1.7           | -0.8           |    |    |
| 24                                 | -0.8             | -0.5           | -0.6           | -0.2           | -0.5           |    |    |
| Amplitude<br>1st Harmonic<br>Phase | 0.4<br>13.2      | 0.4<br>14.1    | 0.4<br>17.0    | 0.7<br>7.2     | 1.1<br>6.9     |    |    |
| Amplitude<br>2nd Harmonic<br>Phase | 0.1<br>9.2       | 0.1<br>4.0     | 0.4<br>2.4     | 0.5<br>1.4     | 0.1<br>9.7     |    |    |



Johnston Island  
16°44' N., 169°31' W.

| Level (mb.)                        | 100            | 80             | 50             | 30             | 20             | 15             | 10              |
|------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|
| Period of Record                   | 5/52<br>-12/60 | 7/54<br>-12/60 | 7/54<br>-12/60 | 7/54<br>-12/60 | 9/56<br>-12/60 | 12/56<br>-1/59 | 11/56<br>-12/58 |
|                                    | Annual Cycle   |                |                |                |                |                |                 |
| January                            | -78.6          | -79.7          | -65.9          | -57.0          | -53.5          | -50.2          | -45.6           |
| February                           | -78.4          | -79.8          | -66.8          | -58.1          | -54.5          | -51.1          | -48.0           |
| March                              | -77.9          | -78.0          | -65.7          | -57.2          | -51.4          | -45.7          | -41.7           |
| April                              | -75.6          | -75.0          | -64.5          | -55.9          | -50.2          | -44.6          | -41.2           |
| May                                | -75.1          | -72.9          | -63.3          | -54.7          | -49.1          | -45.0          | -41.4           |
| June                               | -73.4          | -71.4          | -62.4          | -54.2          | -49.2          | -47.2          | -43.9           |
| July                               | -72.8          | -69.4          | -61.2          | -53.8          | -48.5          | -46.3          | -43.1           |
| August                             | -73.0          | -69.3          | -60.8          | -54.0          | -49.2          | -47.6          | -45.1           |
| September                          | -73.9          | -70.5          | -61.3          | -54.7          | -49.7          | -46.5          | -43.4           |
| October                            | -74.8          | -72.1          | -62.3          | -54.9          | -49.6          | -46.7          | -43.8           |
| November                           | -76.9          | -76.0          | -63.5          | -55.3          | -50.0          | -47.2          | -43.8           |
| December                           | -77.8          | -79.0          | -64.6          | -55.9          | -51.2          | -48.3          | -45.6           |
| Mean                               | -76.0          | -74.4          | -63.5          | -55.5          | -50.5          | -47.2          | -43.9           |
| Amplitude<br>1st Harmonic<br>Phase | 3.8            | 4.7            | 1.3            | 1.5            | 1.6            | 1.4            | 1.0             |
|                                    | 7.9            | 8.0            | 8.4            | 7.9            | 7.6            | 8.1            | 5.9             |
| Amplitude<br>2nd Harmonic<br>Phase | 0.1            | 0.4            | 0.1            | 0.4            | 0.8            | 1.2            | 1.1             |
|                                    | 3.9            | 3.9            | 5.3            | 5.9            | 5.2            | 4.8            | 4.9             |

| Level (mb.)                        | 100              | 80             | 50             | 30             | 20             | 15             | 10              |
|------------------------------------|------------------|----------------|----------------|----------------|----------------|----------------|-----------------|
| Period of Record                   | 5/52<br>-12/60   | 7/54<br>-12/60 | 7/54<br>-12/60 | 7/54<br>-12/60 | 9/56<br>-12/60 | 12/56<br>-1/59 | 11/56<br>-12/58 |
|                                    | 26 - Month Cycle |                |                |                |                |                |                 |
| Months                             |                  |                |                |                |                |                |                 |
| 0                                  | 1.1              | 1.0            | 0.3            | 0.3            | 0.2            | 0.0            | -0.7            |
| 2                                  | -0.6             | -0.4           | 0.0            | 0.2            | 0.1            | -0.1           | -1.9            |
| 4                                  | -0.8             | -1.5           | -1.1           | -0.8           | -0.9           | 0.0            | -0.5            |
| 6                                  | -0.2             | 0.4            | -0.4           | 0.8            | 0.9            | 0.7            | -0.5            |
| 8                                  | 0.5              | 0.3            | -0.3           | 0.7            | 0.2            | -0.9           | -0.7            |
| 10                                 | 0.0              | -0.4           | 0.5            | 0.4            | 0.0            | -1.6           | -1.0            |
| 12                                 | -0.1             | 0.2            | 0.2            | 0.2            | -0.7           | 0.7            | 0.7             |
| 14                                 | -0.1             | 0.2            | 0.1            | 0.0            | 0.8            | 0.5            | 2.0             |
| 16                                 | 0.7              | 0.3            | -0.3           | 0.0            | -0.5           | -1.0           | -0.8            |
| 18                                 | 0.4              | 0.7            | 1.1            | 0.5            | -0.4           | 0.1            | 1.8             |
| 20                                 | -0.4             | 0.4            | 0.9            | -1.0           | -0.7           | -0.2           | 0.5             |
| 22                                 | 0.1              | -1.2           | -1.0           | -1.6           | -0.1           | 0.5            | 0.7             |
| 24                                 | -0.5             | 0.1            | 0.0            | 0.3            | 1.1            | 1.8            | 1.0             |
| Amplitude<br>1st Harmonic<br>Phase | 0.0              | 0.2            | 0.4            | 0.5            | 0.2            | 0.4            | 0.6             |
|                                    | 9.4              | 18.5           | 17.5           | 7.5            | 4.5            | 0.1            | 17.0            |
| Amplitude<br>2nd Harmonic<br>Phase | 0.2              | 0.1            | 0.0            | 0.1            | 0.2            | 0.2            | 0.1             |
|                                    | 0.0              | 12.1           | 2.7            | 0.7            | 11.5           | 0.1            | 9.8             |

Clark AFB, Philippines  
15°16'N., 121°28' E.

| Level (mb.)                        | 100            | 80             | 50             | 30             | 20             | 15             | 10             |
|------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record                   | 7/54<br>-12/60 | 7/54<br>-12/60 | 7/54<br>-12/60 | 9/56<br>-12/60 | 9/56<br>-12/60 | 9/56<br>-12/60 | 9/56<br>-12/60 |
| Annual Cycle                       |                |                |                |                |                |                |                |
| January                            | -80.2          | -79.8          | -65.1          | -57.4          | -50.9          | -46.9          | -41.8          |
| February                           | -80.3          | -80.1          | -66.9          | -59.1          | -52.1          | -48.3          | -43.3          |
| March                              | -79.3          | -79.3          | -67.3          | -56.4          | -50.2          | -46.5          | -39.4          |
| April                              | -79.9          | -79.4          | -66.3          | -55.2          | -49.1          | -45.0          | -39.6          |
| May                                | -79.1          | -78.6          | -63.3          | -53.6          | -46.6          | -43.7          | -37.3          |
| June                               | -78.8          | -75.8          | -63.0          | -54.6          | -48.8          | -45.3          | -40.0          |
| July                               | -77.8          | -71.2          | -62.1          | -53.6          | -48.4          | -46.8          | -40.8          |
| August                             | -78.3          | -71.4          | -61.7          | -53.9          | -49.1          | -47.4          | -41.1          |
| September                          | -78.3          | -73.4          | -62.3          | -54.8          | -49.1          | -46.6          | -41.4          |
| October                            | -79.8          | -75.5          | -62.7          | -54.4          | -48.5          | -45.6          | -38.9          |
| November                           | -80.9          | -79.5          | -64.2          | -55.6          | -49.7          | -46.5          | -40.9          |
| December                           | -81.3          | -81.1          | -64.8          | -56.6          | -50.5          | -46.1          | -41.5          |
| Mean                               | -79.5          | -77.1          | -64.1          | -55.4          | -49.4          | -46.2          | -40.5          |
| Amplitude<br>1st Harmonic<br>Phase | 1.2            | 3.9            | 2.0            | 1.5            | 1.3            | 1.0            | 0.7            |
| Amplitude<br>2nd Harmonic<br>Phase | 7.4            | 8.3            | 8.8            | 9.3            | 7.7            | 7.5            | 7.0            |
| Amplitude<br>1st Harmonic<br>Phase | 0.5            | 1.4            | 0.4            | 0.2            | 0.9            | 1.0            | 1.2            |
| Amplitude<br>2nd Harmonic<br>Phase | 2.4            | 2.7            | 0.5            | 2.3            | 5.6            | 5.4            | 5.2            |

| Level (mb.)                        | 100            | 80             | 50             | 30             | 20             | 15             | 10             |
|------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Period of Record                   | 7/54<br>-12/60 | 7/54<br>-12/60 | 7/54<br>-12/60 | 9/56<br>-12/60 | 9/56<br>-12/60 | 9/56<br>-12/60 | 9/56<br>-12/60 |
| 26 - Month Cycle                   |                |                |                |                |                |                |                |
| Months                             |                |                |                |                |                |                |                |
| 0                                  | 0.3            | -0.3           | 0.6            | 0.7            | 0.5            | 0.3            | -0.4           |
| 2                                  | 0.6            | -0.3           | 0.1            | 0.1            | -0.3           | 0.1            | -1.2           |
| 4                                  | 1.1            | -0.2           | -1.2           | -0.7           | -0.4           | 0.2            | -0.4           |
| 6                                  | 0.1            | 0.4            | -0.8           | 0.4            | -0.6           | -2.1           | -3.0           |
| 8                                  | 0.4            | 0.4            | -0.7           | 0.4            | 0.1            | -0.1           | -0.3           |
| 10                                 | 0.3            | 0.5            | 0.2            | -0.3           | 0.0            | -0.1           | -0.7           |
| 12                                 | 0.6            | 0.2            | 0.0            | -0.1           | -0.4           | -0.1           | 0.7            |
| 14                                 | -0.6           | -0.3           | -0.6           | -1.0           | -1.1           | -0.8           | 0.2            |
| 16                                 | -0.7           | 0.2            | -0.7           | -0.4           | -0.2           | -1.1           | -0.7           |
| 18                                 | -0.4           | -0.2           | 0.5            | 0.2            | -0.4           | -0.3           | 0.7            |
| 20                                 | -1.4           | 0.2            | 1.2            | -0.9           | 0.6            | 1.3            | 2.3            |
| 22                                 | -0.4           | -0.5           | 0.4            | 0.7            | 1.3            | 2.1            | 2.5            |
| 24                                 | 0.0            | -0.1           | 0.4            | 0.8            | 0.8            | 0.4            | 0.5            |
| Amplitude<br>1st Harmonic<br>Phase | 0.7            | 0.5            | 0.5            | 0.4            | 0.5            | 0.8            | 1.0            |
| Amplitude<br>2nd Harmonic<br>Phase | 5.7            | 7.4            | 22.1           | 1.3            | 23.2           | 21.2           | 19.3           |
| Amplitude<br>1st Harmonic<br>Phase | 0.4            | 0.2            | 0.3            | 0.2            | 0.5            | 0.5            | 0.5            |
| Amplitude<br>2nd Harmonic<br>Phase | 2.0            | 4.5            | 10.8           | 10.4           | 9.9            | 9.8            | 9.7            |

Eniwetok Atoll  
11°20'N., 162°20'E.

| Level (mb.)        | 100    | 80     | 50     | 30     | 20     | 15     | 10     |
|--------------------|--------|--------|--------|--------|--------|--------|--------|
|                    | 5/52   | 5/52   | 5/52   | 7/54   | 7/54   | 7/54   | 7/55   |
| Period of Record   | -12/60 | -12/60 | -12/60 | -12/60 | -12/60 | -12/60 | -10/59 |
| Annual Cycle       |        |        |        |        |        |        |        |
| January            | -82.1  | -82.0  | -66.9  | -57.2  | -51.7  | -49.0  | -45.1  |
| February           | -81.9  | -81.5  | -67.2  | -57.6  | -52.6  | -49.0  | -45.5  |
| March              | -81.4  | -80.0  | -66.9  | -56.5  | -50.5  | -46.8  | -43.1  |
| April              | -79.8  | -79.0  | -65.2  | -54.9  | -49.4  | -46.0  | -42.9  |
| May                | -78.5  | -76.7  | -64.5  | -54.8  | -49.2  | -45.8  | -42.8  |
| June               | -76.9  | -73.7  | -63.4  | -53.9  | -49.0  | -45.8  | -43.0  |
| July               | -74.7  | -70.5  | -61.4  | -54.1  | -49.3  | -46.4  | -42.8  |
| August             | -76.2  | -71.0  | -61.5  | -54.4  | -49.6  | -46.8  | -43.5  |
| September          | -77.0  | -72.8  | -62.8  | -55.2  | -50.6  | -47.5  | -43.7  |
| October            | -78.7  | -75.1  | -63.5  | -55.9  | -50.8  | -46.6  | -43.0  |
| November           | -80.3  | -79.1  | -65.0  | -55.5  | -50.0  | -46.5  | -43.6  |
| December           | -81.7  | -82.2  | -65.9  | -55.7  | -49.7  | -45.9  | -43.6  |
| Mean               | -79.1  | -77.0  | -64.5  | -55.5  | -50.2  | -46.8  | -43.6  |
| Amplitude          | 3.0    | 5.1    | 2.3    | 1.4    | 1.3    | 1.2    | 0.9    |
| 1st Harmonic Phase | 7.9    | 7.9    | 8.3    | 8.0    | 7.9    | 7.8    | 8.1    |
| Amplitude          | 0.3    | 0.8    | 0.1    | 0.4    | 0.8    | 1.0    | 0.9    |
| 2nd Harmonic Phase | 2.1    | 2.7    | 1.3    | 5.9    | 5.6    | 5.4    | 5.1    |

| Level (mb.)        | 100    | 80     | 50     | 30     | 20     | 15     | 10     |
|--------------------|--------|--------|--------|--------|--------|--------|--------|
|                    | 5/52   | 5/52   | 5/52   | 7/54   | 7/54   | 7/54   | 7/55   |
| Period of Record   | -12/60 | -12/60 | -12/60 | -12/60 | -12/60 | -12/60 | -10/59 |
| 26 - Month Cycle   |        |        |        |        |        |        |        |
| Months             |        |        |        |        |        |        |        |
| 0                  | -0.2   | 0.8    | 1.5    | 1.4    | 0.8    | 0.5    | -0.1   |
| 2                  | 1.0    | 0.7    | 1.3    | 0.3    | -0.5   | -1.2   | -0.8   |
| 4                  | 1.1    | 0.5    | -0.3   | -1.6   | -1.6   | -1.5   | -2.0   |
| 6                  | -0.1   | 0.8    | 0.2    | 0.0    | 0.1    | -0.7   | 0.0    |
| 8                  | 0.7    | 0.2    | -0.9   | -0.2   | -0.3   | -0.5   | -1.5   |
| 10                 | 0.0    | -0.3   | -0.3   | 0.1    | -0.6   | -0.8   | -1.2   |
| 12                 | -0.7   | -0.1   | -0.2   | -0.5   | -1.1   | -0.6   | -0.2   |
| 14                 | -0.3   | 0.0    | -0.8   | -0.9   | -0.8   | -0.4   | 0.0    |
| 16                 | 0.8    | 0.1    | -0.2   | -0.7   | -0.1   | 0.3    | -0.4   |
| 18                 | -0.5   | -0.8   | -0.3   | 0.2    | 1.0    | 1.3    | 1.9    |
| 20                 | -0.4   | 0.1    | 0.3    | 0.3    | 0.9    | 1.3    | 1.9    |
| 22                 | -0.8   | -1.2   | -0.5   | -0.4   | 0.8    | 0.7    | 0.4    |
| 24                 | -0.7   | -0.8   | 0.2    | 1.9    | 1.4    | 1.5    | 1.7    |
| Amplitude          | 0.3    | 1.0    | 0.7    | 0.7    | 0.9    | 0.9    | 1.3    |
| 1st Harmonic Phase | 5.4    | 5.8    | 25.9   | 24.9   | 22.3   | 20.9   | 20.7   |
| Amplitude          | 0.2    | 0.4    | 0.3    | 0.5    | 0.5    | 0.5    | 0.4    |
| 2nd Harmonic Phase | 4.2    | 2.9    | 0.5    | 10.6   | 9.0    | 8.7    | 8.3    |

**Balboa, Panama**  
8°58' N., 79°35' W.

| Level (mb.)                        | 100            | 80             | 50             | 30             | 20             | 15             | 10              |
|------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|
| Period of Record                   | 7/54<br>-12/60 | 9/56<br>-12/60 | 9/56<br>-12/60 | 9/56<br>-12/60 | 9/56<br>-12/60 | 9/56<br>-12/60 | 11/58<br>-12/60 |
| Annual Cycle                       |                |                |                |                |                |                |                 |
| January                            | -79.7          | -80.3          | -66.8          | -57.8          | -51.8          | -48.7          | -46.1           |
| February                           | -79.7          | -80.2          | -68.8          | -59.8          | -53.4          | -49.1          | -43.6           |
| March                              | -79.6          | -79.6          | -67.7          | -57.4          | -50.2          | -46.0          | -40.5           |
| April                              | -79.8          | -79.5          | -66.2          | -55.8          | -48.3          | -44.6          | -40.1           |
| May                                | -78.7          | -78.6          | -64.9          | -54.3          | -47.4          | -44.5          | -37.5           |
| June                               | -76.8          | -74.7          | -64.2          | -53.4          | -48.4          | -45.6          | -36.1           |
| July                               | -75.8          | -73.0          | -62.3          | -52.7          | -48.2          | -45.5          | -38.8           |
| August                             | -75.6          | -71.9          | -62.5          | -53.2          | -49.2          | -47.5          | -39.8           |
| September                          | -76.0          | -73.2          | -63.7          | -55.0          | -50.4          | -47.5          | -41.2           |
| October                            | -78.2          | -74.2          | -64.0          | -55.6          | -49.8          | -46.2          | -40.2           |
| November                           | -79.8          | -78.1          | -65.4          | -56.4          | -50.4          | -46.1          | -40.0           |
| December                           | -79.6          | -80.3          | -65.7          | -56.4          | -49.9          | -46.0          | -42.2           |
| Mean                               | -79.5          | -77.1          | -64.2          | -55.7          | -49.4          | -46.2          | -40.5           |
| Amplitude<br>1st Harmonic<br>Phase | 2.1<br>8.3     | 4.0<br>8.4     | 2.2<br>8.6     | 1.6<br>8.0     | 1.4<br>7.9     | 1.2<br>7.9     | 2.8<br>7.2      |
| Amplitude<br>2nd Harmonic<br>Phase | 0.7<br>2.1     | 0.8<br>2.6     | 0.4<br>0.5     | 0.6<br>0.2     | 1.1<br>5.7     | 1.3<br>5.5     | 1.4<br>5.3      |

| Level (mb.)                        | 100            | 80             | 50             | 30             | 20             | 15             | 10              |
|------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|
| Period of Record                   | 7/54<br>-12/60 | 9/56<br>-12/60 | 9/56<br>-12/60 | 9/56<br>-12/60 | 9/56<br>-12/60 | 9/56<br>-12/60 | 11/58<br>-12/60 |
| 26 - Month Cycle                   |                |                |                |                |                |                |                 |
| Months                             |                |                |                |                |                |                |                 |
| 0                                  | 0.1            | -0.4           | 1.7            | 1.0            | 0.0            | -0.7           | -1.2            |
| 2                                  | 0.4            | 0.8            | 1.0            | -0.2           | -1.5           | -1.5           | -3.9            |
| 4                                  | -0.6           | -0.9           | -1.0           | -2.2           | -3.3           | -2.6           | -2.3            |
| 6                                  | 0.0            | 1.5            | 0.8            | 0.0            | -0.4           | -0.9           | 0.4             |
| 8                                  | 0.3            | 0.4            | -0.3           | -1.2           | -1.0           | -1.1           | -1.3            |
| 10                                 | 0.4            | 0.9            | -0.3           | -1.0           | -0.4           | -0.2           | 0.6             |
| 12                                 | 0.2            | 0.7            | -0.6           | -1.0           | -0.1           | 0.4            | 1.2             |
| 14                                 | -0.2           | 0.3            | -0.6           | 0.2            | 1.1            | 1.3            | 2.8             |
| 16                                 | 0.1            | -1.1           | -1.4           | -1.4           | -0.4           | -0.1           | 1.2             |
| 18                                 | 0.0            | -0.6           | -0.5           | 0.6            | 1.5            | 1.2            | 2.3             |
| 20                                 | -0.3           | 0.2            | 0.2            | 1.5            | 1.7            | 1.9            | -0.4            |
| 22                                 | 0.1            | -0.6           | -0.4           | 1.3            | 1.3            | 1.1            | 1.3             |
| 24                                 | -0.7           | -1.4           | 1.4            | 2.4            | 1.6            | 1.1            | -0.6            |
| Amplitude<br>1st Harmonic<br>Phase | 0.3<br>6.9     | 0.9<br>7.7     | 0.9<br>0.9     | 1.3<br>22.2    | 1.4<br>18.9    | 1.3<br>17.7    | 2.1<br>15.0     |
| Amplitude<br>2nd Harmonic<br>Phase | 0.1<br>2.0     | 0.1<br>7.7     | 0.3<br>11.5    | 0.6<br>10.1    | 0.6<br>9.7     | 0.5<br>9.5     | 0.3<br>8.8      |

Canton Island  
2°46'S., 171°43'W.

| Level (mb.)                        | 100            | 80             | 50             | 30             | 20             | 15 | 10 |
|------------------------------------|----------------|----------------|----------------|----------------|----------------|----|----|
| Period of Record                   | 5/52<br>-12/60 | 5/52<br>-12/60 | 7/54<br>-12/60 | 7/54<br>-12/60 | 9/56<br>-12/60 |    |    |
|                                    | Annual Cycle   |                |                |                |                |    |    |
| January                            | -83.3          | -82.4          | -66.5          | -57.0          | -52.7          |    |    |
| February                           | -83.1          | -81.8          | -67.4          | -57.8          | -52.8          |    |    |
| March                              | -82.6          | -80.4          | -66.8          | -56.5          | -50.2          |    |    |
| April                              | -81.9          | -79.3          | -66.0          | -55.5          | -49.4          |    |    |
| May                                | -81.1          | -78.2          | -64.4          | -54.6          | -49.6          |    |    |
| June                               | -80.1          | -75.3          | -63.1          | -54.4          | -49.6          |    |    |
| July                               | -79.0          | -72.4          | -62.6          | -55.0          | -50.0          |    |    |
| August                             | -79.5          | -71.8          | -62.6          | -55.1          | -50.4          |    |    |
| September                          | -79.0          | -72.6          | -63.1          | -55.0          | -49.7          |    |    |
| October                            | -81.0          | -75.4          | -63.9          | -55.3          | -49.6          |    |    |
| November                           | -82.4          | -79.6          | -65.1          | -55.1          | -48.8          |    |    |
| December                           | -83.0          | -83.0          | -65.3          | -54.8          | -49.5          |    |    |
| Mean                               | -81.3          | -77.6          | -64.7          | -55.7          | -50.5          |    |    |
| Amplitude<br>1st Harmonic<br>Phase | 2.1<br>8.0     | 4.7<br>8.2     | 2.2<br>8.6     | 1.2<br>8.7     | 1.0<br>8.4     |    |    |
| Amplitude<br>2nd Harmonic<br>Phase | 0.3<br>3.0     | 1.1<br>3.0     | 0.2<br>0.7     | 0.7<br>5.7     | 1.4<br>5.6     |    |    |

| Level (mb.)                        | 100              | 80             | 50             | 30             | 20             | 15 | 10 |
|------------------------------------|------------------|----------------|----------------|----------------|----------------|----|----|
| Period of Record                   | 5/52<br>-12/60   | 5/52<br>-12/60 | 7/54<br>-12/60 | 7/54<br>-12/60 | 9/56<br>-12/60 |    |    |
|                                    | 26 - Month Cycle |                |                |                |                |    |    |
| Months                             |                  |                |                |                |                |    |    |
| 0                                  | 0.1              | 1.4            | 2.3            | 1.4            | 0.6            |    |    |
| 2                                  | 0.9              | 2.1            | 2.4            | -0.1           | -0.6           |    |    |
| 4                                  | 0.6              | 1.1            | 0.4            | -1.7           | -2.3           |    |    |
| 6                                  | 0.9              | 1.6            | 1.0            | -1.8           | -2.1           |    |    |
| 8                                  | 0.9              | 1.0            | 0.0            | -1.8           | -2.0           |    |    |
| 10                                 | 0.0              | 1.1            | -0.6           | -1.2           | -1.0           |    |    |
| 12                                 | -0.3             | 0.1            | -1.0           | -1.1           | -0.2           |    |    |
| 14                                 | -0.2             | 0.1            | -1.5           | -0.4           | -0.4           |    |    |
| 16                                 | 0.0              | -1.3           | -1.9           | -1.2           | 0.6            |    |    |
| 18                                 | -0.9             | -1.9           | -2.0           | 1.2            | 3.5            |    |    |
| 20                                 | -0.8             | -1.2           | -1.0           | 2.0            | 1.8            |    |    |
| 22                                 | -0.6             | -2.9           | -0.7           | 2.6            | 1.5            |    |    |
| 24                                 | -0.6             | -1.4           | 2.7            | 2.1            | 0.7            |    |    |
| Amplitude<br>1st Harmonic<br>Phase | 0.7<br>5.7       | 1.9<br>6.0     | 1.9<br>1.8     | 2.0<br>21.9    | 2.1<br>19.7    |    |    |
| Amplitude<br>2nd Harmonic<br>Phase | 0.1<br>3.8       | 0.5<br>1.8     | 0.7<br>11.9    | 0.5<br>10.2    | 0.1<br>8.1     |    |    |

|  |   |  |   |
|--|---|--|---|
| <p>Navy Weather Research Facility (NWRP 26-0564-092)</p> <p>A CLIMATOLOGY OF WINDS AND TEMPERATURES IN THE TROPICAL STRATOSPHERE BETWEEN 100 MB. AND 10 MB., by Richard J. Reed, May 1964. 56 p., including 1 fig., 13 tables, 14 charts and 2 app.</p> <p>UNCLASSIFIED</p> <p>The recent discovery of a large quasi-periodic oscillation of the zonal wind component in the equatorial stratosphere, with an average period close to 26 months, has aroused new interest in this area and has created a need for climatological information which recognizes the existence of both annual and longer-period variations of wind and temperature. Data (1951-1961) from selected tropical stations are used to characterize the annual and 26-month variations in the zone between 25° N. and 25° S. and in the layer between 100 mb. and 10 mb. Information is also presented on the long-term (10 year) mean zonal wind and the temperature fields and on the short-period (intra-monthly) variability of the zonal and meridional wind components.</p> | <ol style="list-style-type: none"> <li>1. Meteorology.</li> <li>2. Stratospheric Circulations.</li> <li>3. Tropical Circulations.</li> <li>4. Climatology.</li> <li>5. 26-month Wind and Temperature Oscillations.</li> </ol> <p>I. Title: A Climatology of Winds and Temperatures in the Tropical Stratosphere Between 100 Mb. and 10 Mb.</p> <p>II. Reed, R. J.</p> <p>III. NWRP 26-0564-092</p> <p>TASK 26</p> <p>UNCLASSIFIED</p> | <p>Navy Weather Research Facility (NWRP 26-0564-092)</p> <p>A CLIMATOLOGY OF WINDS AND TEMPERATURES IN THE TROPICAL STRATOSPHERE BETWEEN 100 MB. AND 10 MB., by Richard J. Reed, May 1964. 56 p., including 1 fig., 13 tables, 14 charts and 2 app.</p> <p>UNCLASSIFIED</p> <p>The recent discovery of a large quasi-periodic oscillation of the zonal wind component in the equatorial stratosphere, with an average period close to 26 months, has aroused new interest in this area and has created a need for climatological information which recognizes the existence of both annual and longer-period variations of wind and temperature. Data (1951-1961) from selected tropical stations are used to characterize the annual and 26-month variations in the zone between 25° N. and 25° S. and in the layer between 100 mb. and 10 mb. Information is also presented on the long-term (10 year) mean zonal wind and the temperature fields and on the short-period (intra-monthly) variability of the zonal and meridional wind components.</p> | <ol style="list-style-type: none"> <li>1. Meteorology.</li> <li>2. Stratospheric Circulations.</li> <li>3. Tropical Circulations.</li> <li>4. Climatology.</li> <li>5. 26-month Wind and Temperature Oscillations.</li> </ol> <p>I. Title: A Climatology of Winds and Temperatures in the Tropical Stratosphere Between 100 Mb. and 10 Mb.</p> <p>II. Reed, R. J.</p> <p>III. NWRP 26-0564-092</p> <p>TASK 26</p> <p>UNCLASSIFIED</p> |
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